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Butterfly and moth diversity in Serpa (Baixo Alentejo, Portugal): an advance in a yet poorly surveyed region (Insecta: Lepidoptera)

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Abstract

A survey of the little known Lepidoptera diversity in southeast inland Portugal was carried out, resulting in circa 357 species for the region. Among these, 35 are butterflies (Papilionoidea) and the remaining 322 species are moths (several subfamilies). Among these, 13 were novel records for Portugal, of which eight are here presented for the first time. 83 species are new to Baixo Alentejo region. Sampling included oportunistic searches during the day and light-trapping at night during all but one month of the year. This study highlights the scarcity of studies in this region, despite many efforts in the last few years in accomplishing so and having a better picture of the whole of Portugal.
KEY WORDS: Insecta, Lepidoptera, faunistics, distribution, Alentejo, Portugal.

Diversidad de las mariposas y polillas en Serpa (Baixo Alentejo, Portugal): un avance en una región poco estudiada (Insecta: Lepidoptera)

Resumen

Se llevó a cabo un estudio de la poco conocida diversidad de Lepidoptera en el sureste de Portugal, lo que ha resultado en 357 especies para la región. Entre ellas, 35 son mariposas diurnas (Papilionoidea) y las 322 especies restantes, son mariposas nocturnas (varias subfamilias). Entre ellas, 13 son nuevos registros para Portugal, de los cuales ocho se presentan aquí por primera vez. 83 especies son nuevas en la región del Baixo Alentejo. El muestreo incluyó búsquedas oportunistas durante el día y capturas nocturnas con trampa, en todos los meses excepto julio. Este estudio pone de relieve la escasez de estudios en esta región, a pesar de los muchos esfuerzos realizados en los últimos años para lograrlo y tener una mejor imagen de todo Portugal.
PALABRAS CLAVE: Insecta, Lepidoptera, faunística, distribución, Alentejo, Portugal.

Diversidade de borboletas diurnas e nocturnas em Serpa (Baixo Alentejo, Portugal): um avanço numa região ainda pouco estudada (Insecta: Lepidoptera)

Resumo

Um estudo sobre a ainda pouco conhecida fauna de Lepidoptera no interior sudeste de Portugal foi levado a cabo resultando em cerca de 357 espécies para a região. Entre estas, 35 são borboletas diurnas (Papilionoidea) e as restantes 322 espécies são nocturnas (várias subfamílias). Entre elas, 13 constituíram novos registo para Portugal, sendo que oito são aqui apresentadas pela primeira vez. 83 espécies são apresentadas como novas para a região do Baixo Alentejo. A amostragem incluiu a observação activa durante o dia e armadilhamento luminoso durante a noite em todos os meses do ano excepto Julho. Este trabalho releva a ainda escassez de estudos nesta região, apesar dos esforços recentes a nível de todo o Portugal.
PALAVRAS CHAVE: Insecta, Lepidoptera, Faunística, distribuição, Alentejo, Portugal.

Introduction

Long understudied, the rich Lepidoptera diversity of Portugal has seen a revival during the last three decades. During this time span, the country's list has more than doubled, a task accomplished through the effort of many people, expressed best in the many papers belonging to the "Novelties" series in this Journal, aggregating records throughout the country whenever these were deemed important - mainly first or second country citations or considerable range extensions - (CORLEY *et al.,* 2006, 2007, 2008, 2009, 2011, 2012b, 2013). This has culminated in an extensive and detailed fully revised, commented list of Portuguese Lepidoptera, listing 2588 species as confidently occurring in Portugal (CORLEY, 2015). However, despite its completeness, there are still broadly understudied areas and species' phylogenies and ecologies to be investigated. This holds especially relevant for the wide region of Alentejo, which so far has experienced too few studies on its Lepidoptera diversity.

The first records from Alentejo in the literature are those of Reverend A. E. Eaton who, between 5th and 12th May 1880 recorded 12 species in the area of Almodôvar (Beja) (i. e. microlepidoptera revised in CORLEY & GOODEY (2014) and macrolepidoptera already published in STAUDINGER (1881). ZERKOWITZ (1946), while compiling existing records of Portuguese Lepidoptera recognised field-effort was not evenly spread in the country. At his time, the region of Alentejo, with over 27000 km^2 between the Tagus river and the Algarve, scored only 25 known species of butterflies and moths. The apparent monotony, distance from the most urban centres, economic depression and extreme temperatures probably, played a role in keeping lepidopterists away from the region, especially the interior and the south (Baixo Alentejo).

Only recently there was an increase in the knowledge of some marginal parts of Alentejo, namely because of a study at Lagoa de Santo André, by the coast (CORLEY, 2004). The author and colleagues recorded 440 species of butterflies and moths. Otherwise, Lepidoptera records in Alentejo (sensu lato) have been mostly the result of short-term, ad-hoc observations, seasonally and temporally constrained. The few published are very scattered throughout the literature and do not correspond to lengthy work in the same place, especially in the left bank of the Guadiana river. Altogether, between 520 and 600 species records could be retrieved from the literature involving Baixo Alentejo (e.g. CORLEY *et al.,* 2006: 7, 2008: 9, 2009: 14, 2011: 2, 2012a: 6; 2012b: 5, 2013: 13, 2014: 8) but given the sheer size of the region and paucity of field work taking place, many more species are expected to occur there, especially among the 'Microlepidoptera'. Even among the Papilionoidea, despite much advance in the last years (mostly unpublished) it is still considered poorly known (GARCIA-PEREIRA *et al.,* 1999; GARCÍA-BARROS *et al.,* 2004). CORLEY (2015) lists 655 species for the region, this obviously including many non-published records to be formally explained along the current paper.

If Alentejo is fully immersed within the Mediterranean region, bearing an evident dry season and often extreme summer temperatures, there are important nuances. Distance to the Atlantic sea, higher ground, the availability of water year-round or geological islands do modulate microclimate conditions, shaping the landscape and vegetation in various ways. Climax communities would show a prevalence of sclerophillous oak species such as the cork-oak (*Quercus suber* L.) in the west and along inland mesophilic areas and the holm-oak (*Quercus rotundifolia* Lam.) in most of the dry interior. Other communities are represented to a shorter extent, such as pine-tree formations (*Pinus pinaster* Aiton and *P. pinea* L.), followed by a particular flora and fauna over sub-coastal palaeodunes or kermes-oak shrubland over limestones and rocky soils. Through habitat degradation and anthropogenic land-uses, these climax formations are usually replaced by increasingly heliophile and dry-character seral vegetation stages culminating in ephemeral grasslands (COSTA *et al.,* 1998). Between the late 19th century and the carnation-Revolution of 1974, natural habitats in Alentejo were being replaced at an accelerated rate by more intensive crops first linked to cereal production, but largely lacking the use of herbicides but nowadays irrigation-dependent, chemically demanding crops are expanding at an alarming rate.

For practical and political reasons, Alentejo is usually divided into two smaller units: Alto and Baixo Alentejo (High Alentejo and Lower Alentejo). Alto Alentejo, the northern half, is a transition zone from the central, more mountainous part of the country, experiences higher rainfall and includes

higher ground. Baixo Alentejo, to the south is warmer, less populated and studied, but includes coastal areas. Despite this heterogeneity, the Alentejo as a whole is a very distinctive region in Portugal, characterised by its wide plains devoted to agriculture where traditional systems such as the 'montado' and drough-tolerant crops have predominated under a sparse human-settlement.

The 'montado' is a semi-natural open oak-dominated woodland with multiple uses including cork-harvesting, crop growth and animal production. For a long time, traditional management allowed for a sustainable use of the landscape preventing much nutrient loss and the survival of local people. The 'montado', for instance, is able to provide an extensive array of goods and ecosystem services from the cork used in insolation or bottle-stoppers, animal produce, extensive crops, honey, tourism, etc. but has been declining steadily over the last 50 years. Currently, replacement for intensive crops, such as super-intensive olive groves and maize facilitated by the Alqueva infrastructure poses a serious threat to local biological systems.

During the years 1998-2011, I had the chance to explore a 330 ha property in Baixo Alentejo, near the town of Serpa (Beja district). At the time of field-work started, even less was known from the Lepidoptera of Alentejo, the probability of finding relevant new biological data was real. Indeed, many of the species found turned up as new for Portugal and local dynamics and biology of Lepidoptera were completely new ground to be explored. If some of the new species turned up eventually in other areas, the place remains the sole one for others. The objectives first encompassed a pure species inventory along with their associated field data but have evolved in order to accommodate the need to the establishment of a reference situation of local Lepidoptera, prior to the major changes about to happen to the property and Alentejo in general. Furthermore, data from this region is more relevant because of the paucity of records from both this part of Portugal and nearby Spain, involving key elements in need of conservation (e. g. *Melitaea aetherie*), well known migrants and agriculturally relevant species.

Study area

The study site is at Monte da Lage, circa 3 km to the east of the town of Serpa, within the district of Beja, Baixo Alentejo (decimal: 37.957, -7.500; MGRS: 29SPC3102) in Portugal (Fig. 1A). The area under scope is a 320 ha property harbouring a mosaic of land uses including, 1) irrigated and intensive crops within a rotational system (beet, white poppy, maize, onion, etc.), 2) vineyard produce, 3) degraded holm-oak open forest 'montado', 4) pastureland and dry grassland used for wheat and barley crops 5) semi-permanent grasslands or very open 'montado'. There is a seasonally fed stream crossing the whole area, harbouring some remnants of riparian vegetation including *Fraxinus angustifolia* Wahl*, Populus nigra* L.*, Salix atrocinerea* Brot.*, Tamarix africana* Poir. and *Typha domingensis* Pers. In a recent past, most of the area was also subject to intensive grazing involving sheep, especially in grasslands and the 'montado'.

Geology in this part of Alentejo is complex and at the study site one can identify four units of relevance (Fig. 1B: a) Ossa-Morena (OMZ) magmatic and intrusive two mica granite bedrock of the Beja massif, so called Pias granite (305 Ma, Mendes 1967/1968), occupying the most relevant area; b) Ossa-Morena (OMZ) mafic intrusive bedrock of the gabbro-dioritic complex of Cuba, an heterogeneous assemblage of gabbros and anfibolitic diorites (340 Ma, FONSECA & RIBEIRO, 1993c) Ossa-Morena (OMZ) porphyries of Baleizão, mainly represented by dacites and riodacites of acidic vulcanism origin (350 Ma) and d) sedimentary overlay to the previous formations, of continental character and of Tertiary-early Quaternary age, with arenitic and conglomerate formations of fluvial origin, often involving limestones. These different lithologies imply diverse chemical properties to soils and vegetation. If the first three are associated with an acidic environment and silicicole vegetation, those areas covered by the sedimentary formation and deeper soils harbour other species, often calcicole, when not fully cropped.

Temperature and pluviometry data locally collected 1996-2005 indicate a Mediterranean pluvi-stational euoceanic bioclimate, subject to a marked dry season, summer high temperatures and mild winters. Annual precipitation and temperature average at 470 mm and 16.6º C respectively. Precipitation is concentrated in the period October-May, October, December and May being the wettest months

(averaging 74 mm, 56 and 52 mm) while there is negligible precipitation in June-August. Temperatures show strong variations both annually and daily: January is the coldest month (T=8º C but with occasional nights dropping down to -5º C) and August is the hottest (T=24.6º C with day temperatures often reaching 45º C). Daily variation is often up to 15-20º C in the summer. The study site is thus at the boundary of meso-thermomediterranean thermotypes, with a Lower-dry ombrotype. This can be seen within the potential vegetation which would probably evolve under the Luso.Extremaduran (West Mediterranean province, Alentejan district in RIVAS-MARTÍNEZ *et al.,* 2014) holm-oak mesomediterranean silicicolous series (*Pyro Bourgeanae-Quercetum rotundifoliae*), dominated by *Quercus rotundifolia* (holm-oak) and *Pyrus bourgaeana* Decne. (Iberian pear). However, increased drought and winter mild conditions allow for the presence of interspersed wild-olives (*Olea europaea* var. *sylvestris* Brot.). Successional stages can be included among the *Cisto lavanduletea*, with scrublands of *Cistus salviifolius* L., *C. crispus* L. and *Lavandula stoechas* L. as first stages of degradation followed by stands of *Retama spherocarpa* and culminating in Mediterranean seasonally constrained but rich therophytic grasslands involving geophytes and hemicryptophytes, *Poo bulbosae - Trifolietum subterranei*: *Thero Brachipodietea*, *Poetea Bulbosae* and *Tuberarietea Guttatae*). Under nitrophilic conditions, *Echio plantaginei - Galactition tomentosae* becomes widespread. More than 250 plant taxa have been identified from this farm (Marabuto, unpublished). Water availability is critical and becomes almost inaccessible every year from June to September. Then, most of the landscape becomes dry and withered, straw-coloured. Therefore, the phenological maximum of both flora and fauna is attained during late-spring (April-June).

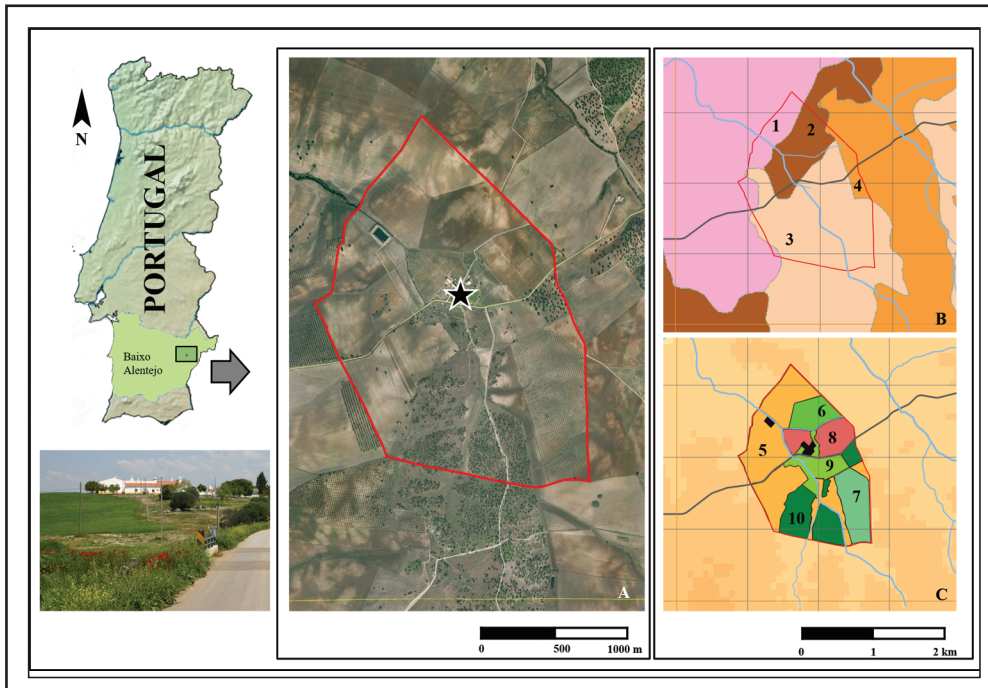

Figure 1.– Study area of Monte da Lage (Serpa, Beja). **A)** Orthophotomap with the area under study inside the polygon. Star indicates light-trap location; **B)** Geological map. Pink (B1) - ZOM, porphyries of Baleizão; Brown (B2) - ZOM gabber-dioritic complex of Cuba; Orange (B3) ZOM - granites of Pias; salmon (B4) Tertiary sedimentary layer. Road and major water courses are represented. **C)** Land use in 2006: C5 - dryland farming; C6) irrigation farming; C7) traditional olive-grove; C8) vineyards; C9) semi-natural grasslands and wasteland; C10) Holm-oak woodland 'Montado'.

Material and methods

Butterflies and moths, including their early stages were sampled across the study area from 1998 to 2011 but mainly in the three seasons of 2002-2004. Butterflies and day-flying moths were recorded during the day through active searching while the nocturnal species were captured at mercury vapour light over a white sheet (160 W blended-bulb) or by a white wall illuminated by a street light. Otherwise, early stages were found and reared upon their visual location in the field. Identification of the majority of species was carried out through external-morphology but specimens belonging to difficult groups were collected for further detailed examination, often including dissection and genetic analysis (DNA Barcoding). The latter was carried out according to protocols in MARABUTO (2009). Field-work, albeit systematic, did not obey to a standardised protocol yet attempted at maximizing the number of species recorded.

The nomenclature of families and species mostly follows Fauna Europaea (KARSHOLT *et al*., 2013) and CORLEY (2015) but with significant changes regarding the order of supra-specific categories, in accordance with most recent phylogenetic studies and an order from the least to most derived taxa within each Superfamily. The nomenclature of plant names follows FLORA-ON (2014).

For each species recorded, information comprises: A) Adult records, consisting of events when the species was encountered, L) early stage records with respective foodplants when available and O) observations, including any relevant taxonomic or ecological information.

Results

The Lepidoptera survey carried out yielded 357 species of Lepidoptera, sampled throughout all but one month of the year (July). Only 35 species of butterflies (Papilionoidea) were recorded while the most diverse assemblage are the Noctuoidea (142 species), followed by the Geometroidea and Pyraloidea (Fig. 2A). The total number of species represents only 13% of the known Portuguese Lepidoptera (CORLEY, 2015) fauna but includes novelties.

An analysis of Lepidoptera occurrence throughout the year shows an uneven richness as the season advances (Fig. 2B). Although there are moths and butterflies during all months, the perceived pattern is bimodal, with peaks in April and August, especially for moths. The richest period in species is the end of April (131 species), followed by the end of August (126). There is a marginal increase of the number of species in October in relation to the end of summer (102 in October *vs* 82 in September). The least diverse time of the year corresponds to the lowest minimum and average temperatures in January.

Prior to this study, eight of the species had never been confirmed in the country: *Metzneria agraphella, Monochroa hornigi, Polyommatus celina, Sciota elegiella, Stemmatophora syriacalis, Cucullia lychnitis, Lemonia philopalus* and *Agrius cingulatus*. Five of these (*P. celina*, *S. elegiella*, *I. manicaria*, *C. lychnitis*) are here confidently reported for the first time, highlighted below with an asterisk: *. The remaining (five species) have been published elsewhere, either in the "New and interesting…" series (CORLEY *et al.,* 2006, 2007, 2009) or in dedicated papers (MARABUTO, 2003, 2006) and appear as an asterisk between brackets: (*). Among the remaining, 83 species are new for the region, Baixo Alentejo, and appear preceded by a '+'. The newly described *Hypsotropa vazquezi* Gastón, Macià, Ylla & Huertas-Dionisio, 2016 was previously known from Portugal, in the Algarve, as *H. vulneratella* (Zeller, 1847), but the record newly presented is the first, oldest confirmed Portuguese specimen for the country. Notable species are shown in Fig. 3.

The most encountered moths were *Rhodometra sacraria*, *Mythimna sicula* and *Agrotis segetum* found in nearly all months of the year, while among the butterflies, *Coenonympha pamphilus* (February-October) and *Lycaena phlaeas* predominate. 144 of the species could only be found once or during one fortnight.

Abbreviations:

A: Adult
L: Larva
P: Pupa
Det. : Determined by.
+ : New for Baixo Alentejo
* : New for Portugal

List of families and species

TINEOIDEA (Following REGIER *et al.,* 2015)
PSYCHIDAE
TYPHONIINAE

+ *Dissoctena albidella* Rebel, 1902
A: 07-X-2006. Previously only recorded from the Algarve in (MONTEIRO & PASSOS DE CARVALHO, 1984).

OIKETICINAE

+ *Oiketicoides eganai* (Agenjo, 1962) (Fig. 3A)
A: 25-26-VIII-2004, 1-IX-2007. Previously only recorded from the Algarve in (MONTEIRO & PASSOS DE CARVALHO, 1984).

TINEIDAE
TINEINAE

Trichophaga bipartitella (Ragonot, 1892)
A: 21-IV-2000, 25-VIII-2004, 07-X-2006, 01-IX-2007.

PERISSOMASTICINAE

Crassicornella agenjoi Petersen, 1957
A: 25-VIII-2004, 7-X-2006, 1-IX-2007.

YPONOMEUTOIDEA (Following SOHN *et al.,* 2013)
PRAYDIDAE

Prays oleae (Bernard, 1788)
A: 7-X-2006.

PLUTELLIDAE

Plutella xylostella (Linnaeus, 1758)
A: 24-IV-2004, 25-VIII-2004.

GELECHIOIDEA (Following HEIKKILÄ *et al.,* 2014)
ELACHISTIDAE
ELACHISTINAE

Elachista nuraghella Amsel, 1951
A: 20-IV-2002, 26-IV-2003, 24-IV-2004.

SCYTHRIDIDAE

Scythris sp.
A: 09-VI-2002.

Enolmis acanthella (Godart, 1824)
A: 25-VIII-2004.

COSMOPTERIGIDAE
COSMOPTERIGINAE

Pyroderces argyrogrammos (Zeller, 1847)
A: 25-VIII-2004.

Eteobalea intermediella (Riedl, 1966)
A: 7-X-2006, det. Martin Corley.

GELECHIIDAE
ANACAMPSINAE

Mesophleps corsicella (Herrich Schaffer, 1856)
A: 7-X-2006.

+ *Nothris verbascella* ([Denis & Schiffermüller], 1775)
L: 23-VI-2003 larvae on *Verbascum sinuatum* L.

ANOMOLOGINAE

Isophrictis kefersteiniellus (Zeller, 1850)
A: 20-IV-2002. (IV)

(*) *Metzneria agraphella* (Ragonot, 1895) (Fig. 3B)
A: 23-VIII-2004, record published in (CORLEY *et al.,* 2006).

(*) *Monochroa hornigi* (Staudinger, 1883) (Fig. 3C)
A: 7-X-2006, det. Martin Corley. Record published in (CORLEY *et al.,* 2007).

GELECHIINAE

Mirificarma eburnella ([Denis & Schiffermüller], 1775)
A: 20-IV-2002

Phthorimaea operculella (Zeller, 1873)
A: 25-VIII-2004

DEPRESSARIIDAE
DEPRESSARIINAE

Agonopterix purpurea (Haworth, 1811)
A: 7-X-2006. Det. Martin Corley.

Depressaria marcella Rebel, 1901
A: 25-I-2003. Det. Martin Corley.

ETHMIINAE

Ethmia bipunctella (Fabricius, 1775)
A: V-1998, 14-II-2002, 20-IV-2002, 25-V-2002, 09-VI-2002, 22-VI-2002, 21-IX-2002, 28-II-2003, 03-III-2003, 28-III-2003, 26-IV-2003, 17-V-2003, 23-VI-2003, 22-II-2004, 13-III-2004, 24-IV-2004, 25-26-VIII-2004.

AUTOSTICHIDAE
SYMMOCINAE

Simmoca alhambrella Walsingham, 1911
A: 24-VIII-2004.

Stibaromacha ratella (Herrich-Schäffer, 1854)
A: 23-VI-2003.

OECOPHORIDAE
OECOPHORINAE

Esperia sulphurella (Fabricius, 1775)
A: 21-IV-2000.

CHOREUTOIDEA
CHOREUTIDAE

Tebenna micalis (Mann, 1857)
A: 17-V-2003.

TORTRICOIDEA
TORTRICIDAE (Following REGIER *et al.,* 2012a)
TORTRICINAE

Clepsis consimilana (Hübner, 1817)
A: 7-X-2006.

Oxypteron schawerdai (Rebel, 1936)
A: 7-X-2006. Det. Martin Corley. Record published in (CORLEY *et al.,* 2009).

+ *Tortrix viridana* Linnaeus, 1758
A: 17-V-2003.

Cochylimorpha decolorella (Zeller, 1839)
A: 12-III-2005.

Cochylimorpha straminea (Haworth, 1811)

A: 7-X-2006.

Phalonidia contractana (Zeller, 1847)
A: 25-VIII-2004.

OLETHREUTINAE

+ *Hedya nubiferana* (Haworth, 1811)
A: 24-IV-2004. **L**: 17-V-2003.

Bactra venosana (Zeller, 1847)
A: 7-X-2006, det. Martin Corley.

Crocidosema plebejana Zeller, 1847
A: 12-III-2005, 26-XI-2006.

Eucosma albuneana (Zeller, 1847)
A: 9-VI-2002. Det. Martin Corley.

+ *Pseudococcyx tessulatana* (Staudinger, 1871)
A: 25-VIII-2004.

Cydia ulicetana (Haworth, 1811)
A: 13-III-2004.

Cydia pomonella (Linnaeus, 1758)
A: XII-1999, 25-VIII-2004.

Cydia strigulatana (Kennel, 1899)
A: 28-III-2003. Det. Martin Corley.

ZYGAENOIDEA
ZYGAENIDAE
ZYGAENINAE

+ *Zygaena sarpedon* (Hübner, 1790)
A: 13-VI-2001, 9-VI-2002. **L:** 20-IV-2002; 25-IV-2003; 16-V-2003; 25-IV-2004 on *Erygium campestre* L.

COSSOIDEA
COSSIDAE
COSSINAE

+ *Dyspessa ululа* (Borkhausen, 1790)
A: 25-V-2002; 26-IV-2003; 17-V-2003 (2); 25-IV-2004 (2).

ZEUZERINAE

Zeuzera pyrina (Linnaeus, 1761)
A: 8-VI-2001.

SESIIDAE
SESIINAE

+ *Paranthrene tabaniformis* (Rottemburg, 1775)
A: 12-VI-2001 Empty pupae and fresh adult on *Salix x sepulchralis* L.

Pyropteron chrysidiformis (Esper, 1782)
A: 22-V-1999; 13-V-2001; 12-VI-2001; 25-V-2002; 25-IV-2004. **L:** 25-IV-2004 in the roots of *Rumex pulcher* L.

Pyropteron hispanica (Kallies, 1999)
A: 25-V-2002.

+ *Pyropteron doryliformis* (Ochsenheimer, 1808)
A: 22-V-1999; 12-VI-2001; 25-V-2002; 9-VI-2002. **L:** 25-IV-2004 in roots of *Rumex pulcher*. Previously only known from the Algarve (CORLEY *et al.,* 2000).

PTEROPHOROIDEA
PTEROPHORIDAE
PTEROPHORINAE

Crombrugghia laetus (Zeller, 1847)
A: 20-IV-2002.

+ *Wheeleria spilodactylus* (Curtis, 1827)
A: 20-IV-2002 - larvae and adults on *Marrubium vulgare* L.; **L:** 28-II-2003 on *M. vulgare*, 14-III-2004 on *M. vulgare*. Previously known from the Algarve (PASSOS DE CARVALHO & CORLEY, 1995) and Tejo Internacional (Beira Baixa) (MARABUTO *et al.,* 2013).

PAPILIONOIDEA
PAPILIONIDAE
PARNASSIINAE

Zerynthia rumina (Linnaeus, 1758)
A: 01-IV-1999, 08-IV-2001, 29-III-2003; **L:** 17-V-2003 on *Aristolochia paucinervis* Pomel.

PAPILIONINAE

Iphiclides feisthamelii (Duponchel, 1832)
A: 8-VI-2002.

Papilio machaon Linnaeus, 1758
A: 21-IV-2002, 26-V-2002, 9-VI-2002, 26-IV-2003; **L:** 8-VI-2002, 22-VI-2002 on *Prangos trifida* (Mill.) Herrnst. & Heyn*, Foeniculum vulgare* L. and *Ridolfia segetum* (L.) Moris*;* 24-VI-2003 on *F. vulgare*. *P. trifida* and *R. segetum* are new foodplants for the species.

HESPERIIDAE
PYRGINAE

Carcharodus tripolina (Verity, 1925)

A: VIII-1997, 12-VI-2001, 26-V-2002, 09-VI-2002, 21-IX-2002, 28-II-2003, 25-IV-2004, 13-VIII-2004, 26-VIII-2004; **L:** 19-I-2002, 26-V-2002, 26-XII-2005 on *Malva sylvestris* L.

+ *Carcharodus baeticus* (Rambur, 1839)

A: 20-IV-2002, 14-III-2004; **L:** 14-II-2002, 28-XII-2004, 26-XII-2005, 27-XII-2006 always on *Marrubium vulgare* L.

HESPERIINAE

Thymelicus sylvestris (Poda, 1761)

A: 26-V-2002, 9-VI-2002, 17-V-2003.

Thymelicus acteon (Rottemburg, 1775)

A: 23-V-1999, 07-IV-2001, 12-VI-2001, 26-V-2002, 9-VI-2002, 17-V-2003, 24-VI-2003, 25-IV-2004.

Gegenes nostrodamus (Fabricius, 1793)

A: 26-VIII-2004.

PIERIDAE
PIERINAE

Euchloe belemia (Esper, 1800)

A: 07-IV-2001, 01-XI-2001, 15-II-2002, 20-IV-2002, 26-V-2002, 25-X-2002, 27-XII-2002, 28-II-2003, 03-III-2003, 29-III-2003, 26-IV-2003, 17-V-2003, 25-IV-2004, 13-III-2005, 05-III-2007; **L:** 08-IV-2001 on *Raphanus raphanistrum* L.

Euchloe crameri Butler, 1869

A: 20-IV-2002, 17-V-2003, 14-III-2004, 25-IV-2004, 05-III-2007.

Pieris brassicae (Linnaeus, 1758)

A: 14-II-2002, 20-IV-2002, 9-VI-2002, 21-IX-2002, 25-X-2002, 03-III-2003, 29-III-2003, 26-IV-2003, 14-III-2004, 25-IV-2004; **L:** 26-IV-2003 on *Raphanus raphanistrum* and *Hirschfeldia incana* (L.) Lagr.-Foss.

Pieris rapae (Linnaeus, 1758)

A: 12-VI-2001, 20-I-2002, 14-II-2002, 20-IV-2002, 26-V-2002, 9-VI-2002, 21-IX-2002, 25-X-2002, 27-XII-2002, 28-II-2003, 3-III-2003, 29-III-2003, 26-IV-2003, 17-V-2003, 24-VI-2003, 14-III-2004, 25-IV-2004, 13-VIII-2004, 13-III-2005, 27-XII-2006, 05-III-2007.

Pontia daplidice Linnaeus, 1758

A: 12-VIII-2000, 21-IV-2002, 26-V-2002, 9-VI-2002, 25-X-2002, 23-VI-2003, 25-IV-2004, 14-VIII-2004.

COLIADINAE

Colias croceus (Fourcroy, 1785)

A: VI-1998, 12-VI-2001, 27-XII-2001, 20-I-2002, 14-II-2002, 20-IV-2002, 26-V-2002, 9-VI-2002, 21-IX-2002, 25-X-2002, 03-III-2003, 29-III-2003, 26-IV-2003, 17-V-2003, 24-VI-2003, 14-III-2004, 25-IV-2004, 27-XII-2006, 5-III-2007.

Gonepteryx cleopatra (Linnaeus, 1767)
A: 12-VI-2001, 9-VI-2002, 13-III-2005.

NYMPHALIDAE
SATYRINAE

Lasiommata megera (Linnaeus, 1767)
A: VI-1998, 26-V-2002, 09-VI-2002, 26-V-2002, 24-VI-2003.

Pararge aegeria (Linnaeus, 1758)
A: 12-VI-2001, 14-II-2002, 20-IV-2002, 26-V-2002, 9-VI-2002, 03-III-2003, 29-III-2003, 17-V-2003, 05-III-2007.

Coenonympha pamphilus (Linnaeus, 1758)
A: VIII-1997, 09-VIII-1999, 08-IV-2001, 12-V-2001, 13-VI-2001, 14-II-2002, 20-IV-2002, 26-V-2002, 9-VI-2002, 21-IX-2002, 25-X-2002, 28-II-2003, 3-III-2003, 29-III-2003, 26-IV-2003, 17-V-2003, 22-VI-2003, 21-II-2004, 14-III-2004, 25-IV-2004, 14-VIII-2004, 26-VIII-2004, 13-III-2005, 5-III-2007.

Maniola jurtina (Linnaeus, 1758)
A: 13-V-2001, 12-VI-2001, 26-V-2002, 9-VI-2002, 21-IX-2002, 25-X-2002, 26-IV-2003, 17-V-2003, 24-VI-2003, 24-IV-2004, 25-IV-2004, 14-VIII-2004, 26-VIII-2004, 1-V-2009.

Pyronia cecilia (Vallantin, 1894)
A: VIII-1997, 12-VI-2001, 26-V-2002, 8-VI-2002, 17-V-2003, 24-VI-2003, 26-VIII-2004.

HELICONIINAE

Issoria lathonia (Linnaeus, 1758)
A: 01-XI-2001. Dying individual on the side of the road. *Viola* spp., the foodplants, are absent from the area and the species was never seen again. Presumed dispersing, non-resident individual.

NYMPHALINAE

Vanessa atalanta (Linnaeus, 1758)
A: 08-IV-2001, 25-X-2002, 27-XII-2002, 03-III-2003, 27-XII-2006, 5-III-2007. **L:** 01-XI-2001, 14-II-2002, 26-XII-2005 on *Urtica membranacea* Poir. and *U. urens* L.

Vanessa cardui (Linnaeus, 1758)
A: 21-V-2000, 01-XI-2001, 20-IV-2002, 26-V-2002, 25-X-2002, 28-II-2003, 03-III-2003, 29-III-2003, 26-IV-2003, 17-V-2003, 24-VI-2003, 21-II-2004, 14-III-2004, 25-IV-2004, 05-III-2007; **L:** 01-XI-2001, 27-XII-2001, 19-I-2002, on *Malva sylvestris*, 20-IV-2002 on *Malva sylvestris, Malva parviflora* L. and *Plantago coronopus* L., 26-IV-2003, 17-V-2003, 26-XII-2005 on *Malva sylvestris*, 01-V-2009 on *Galactites tomentosus* Moench.

+ *Nymphalis polychloros* (Linnaeus, 1758)
A: 14-III-2004.

+ *Melitaea aetherie* (Hübner, 1826)
A: 17-V-2003, 25-IV-2004, 01-V-2009. **L:** 5-III-2007 on *Cynara cardunculus* L.

LYCAENIDAE
LYCAENINAE

Lycaena phlaeas (Linnaeus, 1761)
A: IX-1998, 07-IV-2001, 12-VI-2001, 27-XII-2001, 14-II-2002, 20-IV-2002, 26-V-2002, 8-VI-2002, 25-X-2002, 28-II-2003, 03-III-2003, 29-III-2003, 26-IV-2003, 17-V-2003, 22-VI-2003, 14-III-2004, 25-IV-2004, 14-VIII-2004, 26-VIII-2004, 13-III-2005, 5-III-2007.

THECLINAE

+ *Laeosopis roboris* (Esper, 1793)
A: 22-V-1999, 26-V-2002, 17-V-2003 (5). Adults flying around, mating and ovipositing on wild olive (*Olea europaea* var. *sylvestris*), which is hereby presented as a new foodplant for the species. Otherwise known on *Fraxinus angustifolia* Vahl. and *Phillyrea latifolia* L. (KAN & KAN, 2009).

+ *Tomares ballus* (Fabricius, 1787)
A: 05-III-2007.

Callophrys rubi (Linnaeus, 1758)
A: 14-III-2004, 5-III-2007.

Satyrium esculi (Hübner, 1806)
A: 13-V-2001, 26-V-2002, 17-V-2003, 25-IV-2004; **L:** 08-IV-2001 on *Quercus rotundifolia.*

POLYOMMATINAE

Lampides boeticus (Linnaeus, 1767)
A: 26-V-2002, 9-VI-2002, 17-V-2003, 25-X-2003.

Leptotes pirithous (Linnaeus, 1767)
A: 12-V-2001, 13-VI-2001, 26-V-2002, 9-VI-2002, 21-IX-2002, 17-V-2003, 24-VI-2003, 26-VIII-2004.

Celastrina argiolus (Linnaeus, 1758)
A: 11-VIII-2000, 26-V-2002, 17-V-2003, 14-VIII-2004.

Aricia cramera (Eschscholtz, 1821)
A: 21-V-2000, 12-VI-2001, 20-IV-2002, 26-V-2002, 9-VI-2002, 21-IX-2002, 25-X-2002, 29-III-2003, 26-IV-2003, 17-V-2003, 24-VI-2003, 24-IV-2004, 13-VIII-2004, 25-26-VIII-2004.

* *Polyommatus celina* (Austaut, 1879)
A: 14-II-2002, 20-IV-2002, 26-V-2002, 8-VI-2002, 29-III-2003, 26-IV-2003, 17-V-2003, 22-VI-2003, 14-III-2004, 25-IV-2004, 13-VIII-2004, 26-VIII-2004.

Observations: *Lycaena celina* Austaut, 1879 was originally described from Algeria (AUSTAUT, 1879), owing to certain morphological differences from typical *P. icarus* (Rottemburg, 1775), such as the presence of a submarginal row of black spots on the hindwing upperside and more vivid blue ground-colour in males. For a long time, *Celina* was considered a form, variation or subspecies of *P. icarus.* WIEMERS (2003) first pointed out the non-monophyly of the wide-ranging *Icarus*, as North African samples displayed a deep genetic divergence of up to 5.9-6.8% in COI and 1.5-2.5% in ITS2 from the remaining stock of *P. icarus*, well into the level of different species. Actually, between both clades there

are a number of species, rendering *P. icarus* s.s. not even the sister taxon to P. *celina* but the latter is instead sister to a complex involving also *P. eros* (Ochsenheimer, 1808), *P. icadius* (Groum-Grzhimailo, 1890) and several other, mostly Central Asian, species. Its status was thus updated to full species by WIEMERS *et al.* (2010). Just a year later, (DINCĂ *et al.,* 2011) deepened the knowledge on the biogeography of this species finding out that it replaces *P. icarus* in the Balearic islands, Sicily, Sardinia and is found at least in the southern half of the Iberian Península (in Spain), often in close sympatry or parapatry with *P. icarus.* DINCĂ *et al.* (2011) also reach the conclusion that the two species, albeit easily told appart from genetic data, are only slightly statistically different according to wing-pattern and genital morphology, rendering fiable identification from pictures impossible. In fact, although *Celina*-type specimens have been repeatedly reported from Portugal from as early as before 1910 (MENDES D'AZEVEDO, 1912; WATTISON, 1928; ZERKOWITZ, 1946), wing-pattern and colouration are variable in both *P. icarus* and *P. celina* (WIEMERS, 2003; WIEMERS *et al.,* 2010), there being considerable overlap (DINCĂ *et al.,* 2011). Therefore, very recent observations (HEYDEN, 2013; HEYDEN & VON SETH, 2013) lacking DNA testing and supported only on perceived distribution cannot be granted certainty of the species involved. This holds truer if the dynamics of these butterflies as a fluid phenomenon given slightly different environmental niches and an ever-changing climate are able to produce relic populations, introgressed lineages and even perhaps new hybrid species (Vodă *et al.* 2015). The only way to ascertain the presence of *P. celina* in Portugal is through DNA testing.

A male captured on the 13-VIII-2004 was dissected and two legs sequenced for the 5' end of COI (Barcoding region). Visual inspection of the falces reveals long structures with an evenly curving edge, which by itself is not failure-proof but an indication towards it being *P. celina*, vide DINCĂ *et al.* (2011). On the other hand, sequencing has yielded a 655 bp sequence whose correspondence to available ones identified as *P. celina* on GenBank and BOLD is 100%, there being no overlap between *P. icarus* and *P. celina* COI sequences. More precisely, this sequence corresponds to haplotype hc1 of VODĂ *et al.* (2015). This haplotype is the most widespread in this species, found in insular populations of Pantelleria and Lampedusa (Italy), of extreme northern Morocco (Tangier, Rif), Tunisia and Spain in Andalucía (Granada, Algeciras), Castilla-La Mancha (Ciudad Real) and Murcia (Sierra Espuña). The sequence has been uploaded to GenBank and is available under the acession KX951944.

PYRALOIDEA (Following REGIER *et al.,* 2012b)
PYRALIDAE
GALLERIINAE

Lamoria anella ([Denis & Schiffermüller], 1775)
A: 9-VI-2002, 17-V-2003, 24-IV-2004, 7-X-2006.

Galleria mellonella (Linnaeus, 1758)
A: 13-VIII-2000, 9-VI-2002.

PHYCITINAE

* *Sciota elegiella* (Zerny, 1928) (Fig. 3D)
A: 1-IX-2007. det. Martin Corley. This species was previously known as *S. rungsi* Leraut, 2002 (TL: Granada, Spain) but whose status has been recently revised and sunk into synonymy of *S. elegiella* (TL: Tangier, Morocco) in HUERTAS-DIONISIO *et al.* (2017).

Etiella zinckenella (Treitschke, 1832)
A: 23-VI-2003.

\+ *Epischnia prodromella* (Hübner, 1799)
A: 26-VIII-2004.

Alophia combustella (Herrich-Schäffer, 1855)
A: 7-X-2006, det. Martin Corley.

+ *Psorosa dahliella* (Treitschke, 1832)
A: 23-VI-2003.

Phycita torrenti Agenjo, 1962
A: 1-IX-2007, det. Martin Corley, record published in (CORLEY *et al.,* 2009).

Phycita diaphana (Staudinger, 1870)
A: 7-X-2006, det. Martin Corley.

+ *Acrobasis bithynella* Zeller, 1848
A: 12-III-2005.

Acrobasis obliqua (Zeller, 1847)
A: 26-IV-2003.

Apomyelois ceratoniae (Zeller, 1839)
A: 25-VIII-2004.

+ *Myelois circumvoluta* (Fourcroy, 1785)
A: 22-V-1999, 26-V-2002, 17-V-2003.

Bradyrrhoa cantenerella (Duponchel, 1837)
A: 25-VIII-2004.

(*) *Hypsotropa vazquezi* Gastón, Macià, Ylla & Huertas-Dionisio, 2016 (Fig. 3E)
A: 14-VIII-2004. Previously known from the Algarve as *H. vulneratella* (Zeller, 1847) (MONTEIRO & CARVALHO, 1984; CORLEY *et al.,* 2000) but southwestern Iberian populations of *H. vulneratella* refer to this hitherto cryptic species (GASTÓN *et al.,* 2016).

Ematheudes punctella (Treitschke, 1833)
A: 9-VI-2002.

PYRALINAE

+ *Synaphe lorquinalis* (Guenée, 1854)
A: 26-V-2002, 17-V-2003. Previously known from the Algarve (MONTEIRO & CARVALHO, 1984; CORLEY *et al.,* 2000).

Synaphe punctalis (Fabricius 1775)
A: 24-VI-2003.

+ *Pyralis lienigialis* (Zeller, 1843)
A: 16-V-2003. Previously known from the Algarve (CORLEY, 2005).

Pyralis farinalis (Linnaeus, 1758)
A: 19-VI-2000, 25-V-2002, 21-IX-2002, 16-V-2003.

+ *Aglossa pinguinalis* (Linnaeus, 1758)

A: 26-V-2002, 17-V-2003, 24-IV-2004.

(*) *Stemmatophora syriacalis* (Ragonot, 1895) (Fig. 3F)
A: 1-IX-2007. Det. Martin Corley, record published in (CORLEY *et al.,* 2009).

+ *Loryma egregialis* (Herrich-Schäffer, 1838)
A: 21-IX-2002, 17-V-2003.

Bostra obsoletalis (Mann, 1884)
A: 24-VIII-2004.

Hypsopygia costalis (Fabricius, 1775)
A: 19-VI-2000, 9-VI-2002, 21-IX-2002.

Endotricha flammealis ([Denis & Schiffermüller], 1775)
A: 20-IX-2002, 17-V-2003, 25-VIII-2004.

CRAMBIDAE
PYRAUSTINAE

Achyra nudalis (Hübner, 1796)
A: 25-VIII-2004, 7-X-2006.

Pyrausta despicata (Scopoli, 1763)
A: 24-26-VIII-2004.

Pyrausta aurata (Scopoli, 1763)
A: 8-VIII-1999, 17-V-2003, 26-VIII-2004.

Uresiphita gilvata (Fabricius, 1794)
A: VIII-1998, 26-V-2002, 8-VI-2002, 28-III-2003, 23-VI-2003, 25-26-VIII-2004; **L:** 8-VI-2002, 22-VI-2002, 23-24-V-2003, 24-VI-2003 always on *Retama sphaerocarpa.*

+ *Ostrinia nubilalis* (Hübner, 1796)
A: 17-V-2003, 25-VIII-2004.

SPILOMELINAE

Udea ferrugalis (Hübner, 1796)
A: 20-VIII-1999, 22-VI-2002, 14-II-2004.

+ *Udea bipunctalis* (Herrich-Schäffer, 1851) (Fig. 3G)
A: 25-VIII-2004. Det. Martin Corley.

Udea numeralis (Hübner, 1796)
A: 28-II-2003, 25-IV-2003, 16-V-2003, 13-III-2004.

Diplopseustis perieresalis (Walker, 1859)
A: 26-XI-2006, record published in (CORLEY *et al.,* 2008).

Diasemiopsis ramburialis (Duponchel, 1834)

A: 24-VI-2003.

Spoladea recurvalis (Fabricius, 1775)
A: 7-X-2006.

Palpita vitrealis (Rossi, 1794)
A: 09-VI-2002, 22-VI-2002, 25-X-2002, 28-II-2003, 03-III-2003, 23-VI-2003, 29-XI-2003, 24-VIII-2004.

Dolicharthria punctalis ([Denis & Schiffermüller], 1775)
A: 21-IV-2000, 24-IV-2004.

Antigastra catalaunalis (Duponchel, 1833)
A: 25-VIII-2004.

+ *Metasia suppandalis* (Hübner, 1823)
A: VIII-1998, 23-VI-2003, 14-VIII-2004, 25-VIII-2004.

Nomophila noctuella ([Denis & Schiffermüller], 1775)
A: XII-1998, 22-VI-2002, 25-X-2002, 25-XI-2002, 27-XII-2002, 28-II-2003, 28-III-2003, 25-IV-2003, 16-V-2003, 23-VI-2003.

ODONTIINAE

+ *Aporodes floralis* (Hübner, 1809)
A: 8-VIII-1999, 23-VI-2003.

GLAPHYRIINAE

Evergestis isatidalis (Duponchel, 1833)
A: 15-X-1999, 27-XII-2001, 19-I-2002, 14-II-2002, 25-XI-2002, 08-XII-2002, 27-XII-2002, 28-II-2003, 29-XI-2003.

Hellula undalis (Fabricius, 1781)
A: 7-X-2006.

Hydriris ornatalis (Duponchel, 1832)
A: 26-IV-2003, 23-VI-2003.

SCOPARIINAE

Eudonia angustea (Curtis, 1827)
A: 28-II-2003, 13-III-2004, 24-IV-2004.

Eudonia lineola (Curtis, 1827)
A: 1-IV-1999, 3-III-2003, 13-III-2004. (III-IV)

CRAMBINAE

+ *Euchromius ramburiellus* (Duponchel, 1836)
A: 25-IV-2003.

Agriphila inquinatella ([Denis & Schiffermüller], 1775)
A: 7-X-2006.

+ *Catoptria staudingeri* (Zeller, 1863)
A: 21-IX-2002, 7-X-2006.

Mesocrambus pallidellus (Duponchel, 1836)
A: 22-V-1999, 25-VIII-2004.

Chrysocrambus dentuellus (Pierce & Metcalfe, 1938)
A: 26-V-2002, 09-VI-2002.

Pediasia siculellus (Duponchel, 1836)
A: 7-X-2006.

Pediasia bolivarellus (Schmidt, 1930)
A: 7-X-2006.

Ancylolomia tentaculella (Hübner, 1796)
A: 1-XI-2001, 7-X-2006.

ACENTROPINAE

Parapoynx stratiotata (Linnaeus, 1758)
A: 7-X-2006.

DREPANOIDEA
DEPANIDAE
DREPANINAE

Watsonalla uncinula (Borkhausen, 1790)
A: 17-VI-2000 (2); 15-IX-2001 (2); 14-II-2002 (2); 22-VI-2002 (2); 25-X-2002; 27-XII-2002 (2); 28-II-2003; 3-III-2003 (2); 25-26-IV-2003 (3); 16-17-V-2003 (3); 24-VI-2003; 13-14-VIII-2004 (8); 25-26-VIII-2004; 12-III-2005; 26-XII-2005; 7-X-2006; 27-XII-2006; 1-IX-2007; 10-XI-2010. **L:** 23-XI-2002 on *Quercus rotundifolia*. **P:** 3-III-2003 pupa on *Q. rotundifolia*.

THYATIRINAE

Thyatira batis (Linnaeus, 1758)
A: 21-IV-2000.

+ *Tethea ocularis* (Linnaeus, 1767)
A: 22-IV-2000; 26-IV-2003; 17-V-2003; 25-IV-2004; 13-14-VIII-2004 (3).

GEOMETROIDEA
GEOMETRIDAE (Following ABRAHAM *et al.,* 2001; SIHVONEN *et al.,* 2011)
STERRHINAE

+ *Idaea litigiosaria* (Boisduval, 1840)
A: 26-IV-2003, 16-V-2003, 24-IV-2004.

Idaea macilentaria (Herrich-Schäffer, 1847)
A: 16-V-2003, 24-IV-2004 (2).

Idaea ochrata (Scopoli, 1763)
A: 18-VI-2000, 12-VI-2001, 26-V-2002, 8-9-VI-2002 (2), 22-VI-2002, 16-17-V-2003 (2), 23-VI-2003.

+ *Idaea figuraria* (A. Bang-Haas, 1907)
A: 7-X-2006.

+ *Idaea mustelata* (Gumppenberg, 1892)
A: 22-VI-2002 (2), 23-VI-2003 (7), 24-VI-2003 (3).

Idaea elongaria (Rambur, 1833)
A: 9-VI-2002 (2), 21-IX-2002, 13-14-VIII-2004 (3), 25-26-VIII-2004 (2), 1-IX-2007.

Idaea inquinata (Scopoli, 1763)
A: 16-V-2003. Det. Martin Corley, 25-IV-2004.

+ *Idaea bigladiata* Herbulot, 1975
A: 24-IV-2004, 23-V-2004.

* *Idaea manicaria* (Herrich-Schäffer, 1851) (Fig. 3H)
A: 16-V-2003 (2), 23-24-VI-2003 (2), 13-14-VIII-2004 (16), 25-26-VIII-2004 (2), 1-IX-2007.

Idaea subsericeata (Haworth, 1809)
A: 7-IV-2001, 26-IV-2003.

+ *Idaea cervantaria* (Millière, 1869)
A: 7-X-2006 (4).

Idaea infirmaria (Rambur, 1833)
A: 9-VI-2002, 23-VI-2003, 24-VI-2003 (2).

Idaea eugeniata (Dardoin & Millière, 1870)
A: 20-IX-2002.

Idaea degeneraria (Hübner, 1799)
A: 26-IV-2003 (3), 16-17-V/2003 (4); 24-25/IV/2004 (4).

+ *Scopula ornata* (Scopoli, 1763)
A: 9-VIII-1999, 25-26-IV-2003, 13-14-VIII-2004, 1-IX-2007.

Scopula marginepunctata (Goeze, 1781)
A: X-1998, 7-IV-2001, 26-V-2002, 8-VI-2002, 22-VI-2002, 17-V-2003, 23-VI-2003 (2), 25-IV-2004 (2), 13-14-VIII-2004 (3), 25-26-VIII-2004 (2), 28-XII-2004, 12-III-2005, 10-XI-2010.

Scopula imitaria (Hübner, 1799)
A: 7-IV-2001, 20-IV-2002 (2), 25-26-V-2002 (2), 22-VI-2002 (3), 21-IX-2002, 25-IV-2003, 16-V-2003.

Scopula minorata (Boisduval, 1833)
A: 1-IX-2007.

Timandra comae Schmidt, 1931
A: 17-V-2003.

Cyclophora pupillaria (Hübner, 1799)
A: 28-III-2003, 1-IX-2007; **L:** 26-XII-2011 on *Cistus salviifolius.*

Rhodometra sacraria (Linnaeus, 1767)
A: 26-VIII-1997, 14-II-2002, 20-IV-2002, 8-9-VI-2002 (7), 22-VI-2002 (19), 20-21-IX-2002 (4), 25-X-2002 (18), 28-III-2003, 26-IV-2003, 17-V-2003, 23-24-VI-2003 (30), 25-X-2003, 29-30-XI-2003 (5), 26-XII-2003, 25-IV-2004, 13-14-VIII-2004 (76), 25-26-VIII-2004 (2), 12-III-2005 (2), 26-XII-2005, 7-X-2006 (6), 26-XI-2006 (5), 27-XII-2006, 1-IX-2007, 10-XI-2010, 26-XII-2011.

Lythria sanguinaria (Duponchel, 1842)
A: 17-V-2003, 13-III-2005.

LARENTIINAE

Scotopteryx peribolata (Hübner, 1817)
A: 1-XI-2001, 25-X-2003.

Orthonama obstipata (Fabricius, 1794)
A: 22-IV-2000 (2), 26-V-2002, 29-XI-2003 (3), 24-IV-2004, 26-XI-2006 (4).

+ *Xanthorhoe fluctuata* (Linnaeus, 1758)
A: 1-IV-1999, 27-XII-2001 (2), 20-I-2002 (2), 14-15-II-2002 (3), 23-XI-2002 (2), 8-XII-2002, 25-I-2003 (2), 3-III-2003, 25-IV-2003, 12-III-2005 (3), 7-X-2006 (2), 26-XI-2006 (2), 27-XII-2006 (13), 4-III-2007 (2).

Costaconvexa polygrammata (Borkhausen, 1794)
A: 16-V-2002, 26-V-2002, 09-VI-2002, 16-V-2003.

+ *Epirrhoe alternata* (Müller, 1764)
A: 26-IV-2003 (3), 24-25-IV-2004 (2).

+ *Nebula ibericata* (Staudinger, 1871)
A: XII-1998, 14-15-II-2002 (8), 20-IV-2002, 8-XII-2002 (2), 27-XII-2002, 3-III-2003, 28-III-2003, 25-X-2003 (4), 14-II-2004 (3), 13-III-2004 (3), 12-III-2005 (4), 7-X-2006 (3), 26-XI-2006, 27-XII-2006, 4-III-2007.

Gymnoscelis rufifasciata (Haworth, 1809)
A: 25-I-2003, 16-17-V-2003 (8), 23-24-VI-2003 (3), 25-X-2003, 29-XI-2003, 14-II-2004 (2), 22-II-2004, 13-III-2004, 13-VIII-2004, 26-XI-2006 (2), 4-III-2007 (2), 1-IX-2007; **L:** 09-VI-2002 on the flowers of *Scabiosa atropurpurea* L. and *Eriobotrya japonica* (Thunb.) Lindl.

+ *Eupithecia massiliata* Millière, 1865
A: 26-XII-2003, 12-III-2005.

+ *Eupithecia breviculata* (Donzel, 1837)

A: 16-V-2003.

Eupithecia irriguata (Hübner, 1813)
A: 28-II-2003, 12-III-2005.

Eupithecia centaureata ([Denis & Schiffermüller], 1775)
A: 9-VI-2002, 25-X-2002 (2), 28-II-2003, 3-III-2003 (2), 25-IV-2004 (2), 13-VIII-2004 (2), 14-VIII-2004 (2), 25-26-VIII-2004 (2), 1-IX-2007.

+ *Chesias rufata* (Fabricius, 1775)
A: 26-XI-2006.

GEOMETRINAE

+ *Aplasta ononaria* (Fuessly, 1783)
A: 22-VI-2002, 13-14-VIII-2004 (3), 25-VIII-2004 (2).

Pseudoterpna coronillaria (Hübner, 1817)
L: 7-IV-2001 larva on *Retama sphaerocarpa.*

+ *Phaiogramma etruscaria* (Zeller, 1849)
A: 15-VIII-1998, 21-IV-2000, 26-IV-2003, 17-V-2003, 25-IV-2004, 14-VIII-2004 (3), 25-26-VIII-2004.

Phaiogramma faustinata (Millière, 1868)
A: 24-VI-2003, 14-VIII-2004, 7-X-2006.

Microloxia herbaria (Hübner, 1813)
A: 26-VIII-1997, 22-VI-2002 (2), 24-VI-2003 (4), 13-14-VIII-2004 (13), 25-26-VIII-2004 (2), 7-X-2006 (3), 1-IX-2007; **L:** 8-VIII-1999 on the flowers of *Mentha suaveolens* Ehrh.

ENOMIINAE

Abraxas pantaria (Linnaeus, 1767)
A: 27-VIII-1999, 8-VI-2002, 22-VI-2002, 13-VIII-2004 (79), 14-VIII-2004 (45), 25-26-VIII-2004.

Stegania trimaculata (Villers, 1789)
A: 14-VIII-2004 (6), 25-26-VIII-2004 (2), 7-X-2006.

Rhoptria asperaria (Hübner, 1817)
A: 20-IV-2002, 25-IV-2004.

Isturgia miniosaria (Duponchel, 1829)
A: 26-VIII-1997.

+ *Isturgia deerraria* (Walker, 1861)
A: 7-X-2006. Previously known from the Algarve (MONTEIRO & CARVALHO, 1984; CORLEY *et al.,* 2000).

Acanthovalva inconspicuaria (Hübner, 1819)

A: 7-X-2006.

+ *Neognopharmia stevenaria* (Boisduval, 1840)
A: 8-VIII-1999, 25-IV-2003, 25-IV-2004, 13-14-VIII-2004 (7), 25-26-VIII-2004 (3).

Pachycnemia hippocastanaria (Hübner, 1799)
A: 1-IV-1999, 17-V-2003.

+ *Ennomos fuscantaria* (Haworth, 1809)
A: 26-VIII-1997, 15-IX-2001.

+ *Crocallis tusciaria* (Borkhausen, 1793)
A: 8-XI-1999, 10-XI-2010.

Chemerina caliginearia (Rambur, 1833)
A: 8-XII-2002, 27-XII-2002 (2), 28-XII-2004, 12-III-2005 (2), 27-XII-2006 (2).

Menophra japygiaria (O. Costa, 1849)
A: 22-V-1999, 20-I-2002 (2), 20-IV-2002, 22-VI-2002 (2), 3-III-2003 (2), 28-III-2003, 26-IV-2003, 17-V-2003 (2), 23-VI-2003, 29-30-XI-2003 (4), 26-XII-2003, 13-14-VIII-2004 (3), 25-26-VIII-2004 (7), 28-XII-2004 (2), 7-X-2006 (2), 26-XI-2006, 1-IX-2007.

Peribatodes ilicaria (Geyer, 1833)
A: 15-VIII-1998 (2), 20-IV-2002 (2), 25-26-V-2002 (3), 22-VI-2002, 3-III-2003, 28-III-2003, 25-26-IV-2003 (4), 16-17-V-2003 (2), 24-VI-2003, 7-X-2006 (4).

Adactylotis gesticularia (Hübner, 1817)
A: 1-IV-1999, 20-IX-2002, 26-IV-2003, 24-IV-2004, 4-III-2007.

Tephronia sepiaria (Hufnagel, 1767)
A: 8-VIII-1999 (2), 20-IX-2002, 13-14-VIII-2004 (11), 25-26-VIII-2004 (2), 7-X-2006 (5), 1-IX-2007.

+ *Charissa mucidarius* (Hübner, 1799)
A: 14-II-2002.

Dyscia penulataria (Hübner, 1819)
A: 07-X-2006.

Aspitates ochrearia (Rossi, 1794)
A: X-1998, 15-X-1999, 20-IV-2002 (3), 21-IX-2002 (2), 25-X-2002, 28-III-2003 (4), 29-III-2003, 25-26-IV-2003 (14), 24-25-IV-2004 (12), 12-III-2005 (7), 7-X-2006 (4).

Onychora agaritharia (Dardoin, 1842)
A: 25-X-2003, 7-X-2006.

NOCTUOIDEA (Following ZAHIRI *et al.,* 2010)
NOTODONTIDAE
PHALERINAE

Phalera bucephala (Linnaeus, 1758)

A: 26-VIII-1997.

THAUMETOPOEINAE

Thaumetopoea pityocampa ([Denis & Schiffermüller], 1775)
A: 15-VIII-1998, 11-VIII-2000, 13-14-VIII-2004 (13), 25-26-VIII-2004 (2), 1-IX-2007; **L:** 28-II-2003*,* 14-II-2004 on *Pinus pinea.*

NOTODONTINAE

Cerura iberica Templado & Ortiz, 1966
A: 7-IV-2000, 22-IV-2000, 28-III-2003, 24-IV-2004.

+ *Furcula bifida* (Brahm, 1787)
A: 15-VIII-1998, 8-VIII-1999, 20-IV-2002, 22-VI-2002, 28-III-2003; **L:** 21-IX-2002 on *Salix* x *sepulchralis.*

Harpyia milhauseri (Fabricius, 1775)
A: 3-IX-2001, 28-III-2003, 23-25-VI-2003 (4), 14-VIII-2004 (2), 25-VIII-2004.

Pterostoma palpina (Clerck, 1759)
A: 26-IV-2003.

EREBIDAE (Following ZAHIRI *et al.,* 2012)
HYPENINAE

Hypena obsitalis (Hübner, 1813)
A: 23-VI-2003, 26-XI-2006 (2).

Hypena lividalis (Hübner, 1796)
A: 26-XII-2011.

LYMANTRIINAE

Ocneria atlantica (Rambur, 1837)
A: 1-IX-2007.

HERMINIINAE

Nodaria nodosalis (Herrich-Schäffer, 1851)
A: 20-IV-2002, 16-V-2004, 14-VIII-2004.
ARCTIINAE (Following SCOTT *et al.,* 2014; ZASPEL *et al.,* 2014; RÖNKÄ *et al.,* 2016)

Paidia rica (Freyer, 1858)
A: 8-9-VI-2002 (4), 21-IX-2002, 25-VIII-2004 (2), 1-IX-2007.

Apaidia mesogona (Godart, 1824)
A: 25-VIII-2004, 7-X-2006.

Eilema caniola (Hübner, 1808)

A: VIII-1997, 25-26-V-2002 (4), 8-9-VI-2002 (4), 20-IX-2002, 25-X-2002, 25-26-IV-2003 (4), 16-17-V-2003 (13), 24-25-IV-2004 (6), 14-VIII-2004 (2), 25-26-VIII-2004, 7-X-2006, 1-IX-2007.

Eilema marcida (Mann, 1859)

A: 17-VI-2000 (2), 8-IV-2001, 26-V-2002 (5), 8-9-VI-2002 (17), 22-VI-2002 (2), 25-X-2002, 16-17-V-2003 (5), 23-24-VI-2003 (6), 14-VIII-2004 (3), 25-26-VIII-2004, 7-X-2006 (3), 1-IX-2007.

Utetheisa pulchella (Linnaeus, 1758)

A: 1-XI-2001, 20-IX-2002, 25-X-2002 (2), 25-X-2003, 25-26-VIII-2004 (11), 7-X-2006 (4), 26-XI-2006 (6); **L:** 26-VIII-2004 abundant on *Heliotropium europaeum*.

Coscinia cribraria (Linnaeus, 1758)

A: 22-V-1999, 21-IV-2000, 8-IV-2001, 15-IX-2001 (2), 20-IV-2002 (10), 25-26-V-2002 (3), 20-21-IX-2002 (8), 25-X-2002, 28-III-2003, 25-26-IV-2003 (22), 16-17-V-2003 (14), 24-25-IV-2004 (47), 13-VIII-2004, 25-26-VIII-2004 (6), 7-X-2006, 1-IX-2007. **L:** 27-XII-2000, 27-XII-2001, 27-XII-2002, 3-III-2003, 30-XI-2003, 14-III-2004, 13-VIII-2004, 26-XII-2005, 4-III-2007 under rocks and on several low-growing plants.

Observations: All specimens correspond to subspecies *Coscinia cribraria chrysocephala* (Hübner, 1810).

Cymbalophora pudica (Esper, 1785)

A: VIII-1996, 26-VIII-1997, 15-IX-2001 (2), 20-IX-2002 (2), 21-IX-2002, 25-VIII-2004, 26-VIII-2004, 7-X-2006 (24); **L:**. 8-IV-2001, 15-II-2002, 27-XII-2002, 25-I-2003, 3-III-2003, 14-II-2004, 21-II-2004, 26-XII-2005, 4-III-2007 under rocks and on *Urginea martima* (L.) Baker or Gramineae clumps.

Ocnogyna baetica (Rambur, 1836)

L: III-1998, XII-1999, 8-IV-2001, 19-I-2002, 14-II-2002, 14-II-2004, 20-II-2004, 12-III-2005, 4-III-2007 on *Urginea maritima*, *Asphodelus ramosus* Z. Díaz & Valdés, *Galactites tomentosa*, *Senecio vulgaris* L., Gramineae.

Phragmatobia fuliginosa (Linnaeus, 1758)

A: 12-IX-1997, 17-IV-2001, , 25-V-2002, 8-9-VI-2002 (15), 29-III-2003, 25-IV-2003, 24-25-IV-2004 (3); **L:** 1-XI-2001 on *Sonchus oleraceus* L.

Arctia villica (Linnaeus, 1758)

A: IV-1998, 21-IV-2000, 25-IV-2004.

TOXOCAMPINAE

+ *Tathorhynchus exsiccata* (Lederer, 1855)

A: 17-VI-2000.

Apopestes spectrum (Esper, 1787)

A: 17-VI-2000 larvae on *Retama sphaerocarpa.*

BOLETOBINAE

Odice pergrata (Rambur, 1858)

A: 22-VI-2002, 21-IX-2002, 23-VI-2003, 25-VIII-2004.

Odice jucunda (Hübner, 1813)
A: 22-VI-2002, 21-IX-2002, 25-26-VIII-2004, 1-IX-2007.

Eublemma parva (Hübner, 1808)
A: VIII-1998, 22-VI-2002 (4), 20-IX-2002, 13-14-VIII-2004 (41), 25-26-VIII-2004, 26-XI-2006, 1-IX-2007.

Eublemma ostrina (Hübner, 1808)
A: VIII-1998, 22-IV-2000, 22-VI-2002, 25-X-2002 (2), 28-III-2003, 24-IV-2004, 25-IV-2004, 13-14-VIII-2004 (10), 25-26-VIII-2004, 7-X-2006 (3), 1-IX-2007.

Eublemma scitula (Rambur, 1833)
A: 26-VIII-2004.

EREBINAE

Catocala nymphagoga (Esper, 1787)
A: VI-1998.

Catocala elocata (Esper, 1787)
A: 13-VIII-2004, 25-VIII-2004.

+ *Ophiusa tirhaca* (Cramer, 1773)
A: 26-IV-2003.

Dysgonia algira (Linnaeus, 1767)
A: VIII-1998, 26-IV-2003, 14-VIII-2004 (6), 26-VIII-2004 (2). (IV, VIII)

NOLIDAE (Following ZAHIRI *et al.,* 2013a)
NOLINAE

Meganola togatulalis (Hübner, 1796)
A: 17-V-2003, 13-14-VIII-2004 (3), 1-IX-2007.

Nola squalida Staudinger, 1871
A: 10-XI-2010.

Nola infantula Kitt, 1926
A: 24-VI-2003; **L:** 8-VI-2002 on *Scabiosa atropurpurea.*

CHLOEPHORINAE

Bena bicolorana (Fuessly, 1775)
A: 13-VIII-2004.

Nycteola revayana (Scopoli, 1772)
A: 26-VIII-2004.

Nycteola siculana (Fuchs, 1899)
A: 24-VI-2003.

Earias insulana (Boisduval, 1833)
A: 25-X-2002

NOCTUIDAE (Following ZAHIRI *et al.,* 2013b)
PLUSIINAE

Trichoplusia ni (Hübner, 1803)
A: 22-V-1999, 12-VI-2001, 22-VI-2002, 29-III-2003, 13-VIII-2004 (5), 25-26-VIII-2004, 26-XI-2006 (29), 1-IX-2007.

Thysanoplusia orichalcea (Fabricius, 1775)
A: 27-XII-2002, 23-VI-2003, 13-VIII-2004.

Ctenoplusia accentifera (Lefèbvre, 1827)
A: 20-IV-2002.

Chrysodeixis chalcites (Esper, 1789)
A: 15-IX-2001, 22-VI-2002, 14-VIII-2004, 24-26-VIII-2004 (4), 1-IX-2007.

Autographa gamma (Linnaeus, 1758)
A: 12-VI-2001, 1-XI-2001, 20-IV-2002, 25-V-2002, 8-9-VI-2002 (3), 22-23-VI-2002 (2), 3-III-2003, 26-IV-2003, 17-V-2003 (2), 30-XI-2003, 24-IV-2004 (2), 26-XI-2006 (25), 27-XII-2006.

ACONTIINAE

Metopoceras felicina (Donzel, 1844)
A: 1-IV-1999, 7-IV-2000, 21-22-IV-2000, 20-IV-2002, 25-26-IV-2003 (3), 17-V-2003, 25-IV-2004 (2).

Acontia lucida (Hufnagel, 1766)
A: 12-IX-1997, 17-VI-2000, 12-VI-2001, 15-IX-2001, 25-26-V-2002 (3), 8-9-VI-2002 (12), 22-VI-2002 (10), 20-21-IX-2002 (3), 28-29-III-2003, 25-26-IV-2003 (8), 16-17-V-2003 (11), 23-24-VI-2003 (9), 24-25-IV-2004 (7), 13-14-VIII-2004 (8), 25-26-VIII-2004, 1-IX-2007.

Acontia trabealis (Scopoli, 1763)
A: 12-IX-1997, 11-IV-2001, 26-V-2002, 9-VI-2002 (27), 22-VI-2002 (21), 17-V-2003 (19), 23-24-VI-2003 (5), 25-IV-2004, 13-14-VIII-2004 (45), 25-26-VIII-2004, 1-IX-2007.

AEDIINAE

Aedia leucomelas (Linnaeus, 1758)
A: 25-V-2002, 23-VI-2003.

Tyta luctuosa ([Denis & Schiffermüller], 1775)
A: 2-IV-1999, 12-VI-2001, 15-IX-2001 (2), 20-IV-2002 (4), 25-26-V-2002 (4), 8-9-VI-2002 (21), 22-VI-2002 (28), 20-21-IX-2002 (9), 29-III-2003, 26-IV-2003, 16-17-V-2003 (30), 23-24-VI-2003 (13), 24-25-IV-2004 (3), 13-14-VIII-2004 (13), 25-VIII-2004, 7-X-2006 (5), 4-III-2007, 1-IX-2007.

RAPHIINAE

Raphia hybris (Hübner, 1813)

A: 22-IV-2000 (2), 20-IV-2002, 20-IX-2002 (2), 17-V-2003, 24-IV-2004, 25-VIII-2004.

ACRONICTINAE

+ *Acronicta psi* (Linnaeus, 1758)
L: 17-V-2003 on *Pyrus bourgaeana.*

Acronicta rumicis (Linnaeus, 1758)
A: 26-VIII-1997, 27-I-2001, 25-V-2002, 9-VI-2002, 22-VI-2002, 26-IV-2003, 17-V-2003, 24-VI-2003, 25-VIII-2004; **L:** III-1998 on *Rumex pulcher*, 27-XII-2000 on *Mentha suaveolens,* 8-VI-2002 on *Scabiosa atropurpurea.*

+ *Craniophora pontica* (Staudinger, 1878)
A: 26-VIII-2004.

METOPONIINAE

+ *Aegle vespertinalis* (Rambur, 1866)
A: 15-VIII-1998, 17-VI-2000 (2), 14-VIII-2004, 25-VIII-2004.

+ *Synthymia fixa* (Fabricius, 1787)
A: 16-V-2003.

CUCULLIINAE

Cucullia calendulae Treitschke, 1835
A: 1-IV-1999, 15-X-1999, 1-XI-2001 (2), 20-I-2002, 14-15-II-2002 (4), 25-X-2002, 23-XI-2002 (3), 8-XII-2002 (4), 27-XII-2002 (3), 25-I-2003, 28-II-2003 (4), 3-III-2003 (5), 28-29-III-2003 (13), 14-II-2004, 17-V-2003, 29-30-XI-2003 (43), 26-XII-2003 (6), 14-II-2004, 22-II-2004, 13-III-2004, 24-25-IV-2004 (20), 28-XII-2004, 26-XII-2005 (5), 26-XI-2006 (177), 27-XII-2006 (5), 4-III-2007. **L:** 26-IV-2003, 21-II-2004 on *Calendula arvensis* L.

+ *Cucullia chamomillae* ([Denis & Schiffermüller], 1775)
A: 12-III-2005. Dissected.

Cucullia verbasci (Linnaeus, 1758)
A: 4-III-2000; 7-8-IV-2001; 15-II-2002; 28-II-2003; 28-III-2003; 14-II-2004; 22-II-2004. **L:** 8-IV-2001, 12-V-2001, 26-IV-2003, 17-V-2003, 24-IV-2004 on *Verbascum sinuatum* leaves and basal rosette.

+ *Cucullia scrophulariphila* Staudinger, 1859
A: 26-IV-2003; 24-25-IV-2004. **L:** 16-V-2003, 23-VI-2003 on flowering stems of *Scrophularia auriculate* L.

* *Cucullia lychnitis* Rambur, 1833 (Fig. 3I)
L: 8-VI-2002 on flowering stems of *Verbascum sinuatum*.

ONCOCNEMIDINAE

Callophasia platyptera (Esper, 1788)
A: VIII-1997, 15-IX-2001, 8-VI-2002, 28-III-2003, 14-VIII-2004.

+ *Omphalophana serrata* (Treitschke, 1835)
A: 22-IV-2000, 25-IV-2003.

Cleonymia baetica (Rambur, 1837)
A: 21-IV-2000, 7-IV-2001, 20-IV-2002 (2), 25-26-IV-2003 (6), 24-25-IV-2004 (10).

Cleonymia yvanii (Duponchel, 1833)
A: 26-IV-2003, 17-V-2003, 24-25-IV-2004 (13).

AMPHIPYRINAE

+ *Bryonycta pineti* (Staudinger, 1859)
A: 4-III-2000. Previously known from the Algarve (PASSOS DE CARVALHO & CORLEY, 1995).

+ *Allophyes alfaroi* Agenjo, 1951
A: 26-XII-2005, 26-XI-2006 (2), 27-XII-2006 (2), 26-XII-2011 (2).

HELIOTHINAE

Heliothis peltigera ([Denis & Schiffermüller], 1775)
A: VIII-1998, 7-IV-2001, 26-V-2002, 8-9-VI-2002 (6), 24-VI-2003, 13-VIII-2004.

Heliothis nubigera Herrich-Schäffer, 1851
A: 17-V-2003.

Heliothis incarnata (Freyer, 1838)
A: 7-IV-2000, 21-IV-2000, 8-9-VI-2002 (3), 24-25-IV-2004.

Helicoverpa armigera (Hübner, 1808)
A: IX-1998, 8-IV-2001, 15-IX-2001, 8-9-VI-2002 (7), 22-VI-2002 (3), 20-IX-2002, 25-X-2002 (6), 23-XI-2002, 28-III-2003, 26-IV-2003 (4), 17-V-2003, 23-24-VI-2003 (6), 7-X-2006 (4); **L:** 22-VI-2003 on *Misopates orontium* (L.) Raf.

BRYOPHILINAE

Cryphia algae (Fabricius, 1775)
A: VIII-1998, 20-21-IX-2002 (3), 14-VIII-2004, 25-26-VIII-2004, 7-X-2006, 1-IX-2007.

+ *Bryophila ravula* (Hübner, 1813)
A: 18-VI-2000, 15-IX-2001, 9-VI-2002 (5), 22-VI-2002 (2), 20-21-IX-2002 (12).

Nyctobrya muralis (Forster, 1771)
A: 23-VI-2003, 25-VIII-2004, 1-IX-2007.

NOCTUINAE

Spodoptera exigua (Hübner, 1808)
A: 15-IX-1999, 15-IX-2001, 2-XI-2001 (2), 25-26-V-2002 (13), 8-9-VI-2002 (12), 22-VI-2002 (8), 20-IX-2002 (5), 25-X-2002 (6), 16-17-V-2003 (14), 23-24-VI-2003 (16), 24-IV-2004 (2), 13-VIII-2004, 25-26-VIII-2004 (2), 7-X-2006 (4), 26-XI-2006 (2), 1-IX-2007.

Spodoptera cilium Guenée, 1852
A: 15-X-1999.

Spodoptera littoralis (Boisduval, 1833)
A: 26-VIII-2004.

+ *Caradrina proxima* Rambur, 183
A: 7-X-2006.

Caradrina aspersa Rambur, 1834
A: 26-VIII-2004.

Caradrina germainii (Duponchel, 1835)
A: 7-X-2006.

Caradrina flavirena Guenée, 1852
A: 1-IX-2007.

+ *Caradrina noctivaga* Bellier, 1863
A: 1-IV-1999, 20-IV-2002 (2), 28-III-2003 (2), 25-26-IV-2003 (9), 25-IV-2004 (2), 12-III-2005, 4-III-2007.

Caradrina clavipalpis Scopoli, 1763
A: 7-IV-2000, 20-IV-2002 (2), 26-V-2002, 8-VI-2002, 23-XI-2002, 25-IV-2003 (2), 16-17-V-2003 (5), 25-IV-2004 (2), 26-VIII-2004, 7-X-2006 (2), 27-XII-2006.

Hoplodrina ambigua ([Denis & Schiffermüller, 1775])
A: 21-IV-2000, 20-IV-2002 (4), 25-26-V-2002 (13), 9-VI-2002, 25-26-IV-2003 (15), 16-17-V-2003 (14), 25-X-2003, 24-25-IV-2004 (5), 7-X-2006 (4), 1-IX-2007, 10-XI-2010 (2).

Proxenus hospes (Freyer, 1831)
A: 25-26-V-2002 (2), 8-9-VI-2002 (2), 26-IV-2003 (3), 16-17-V-2003 (22), 24-VI-2003 (2), 24-IV-2004.

Thalpophila vitalba (Freyer, 1834)
A: 15-X-1999.

+ *Chloantha hyperici* ([Denis & Schiffermüller], 1775)
A: 22-V-1999, 9-VI-2002.

Phlogophora meticulosa (Linnaeus, 1758)
A: VIII-1998.

+ *Gortyna xanthenes* Germar, 1842
A: 15-X-1999, 1-XI-2001. Previously known from the Algarve (CORLEY *et al.,* 2000).

+ *Luperina dumerilii* (Duponchel, 1826)
A: 15-X-1999.

Oria musculosa (Hübner, 1808)
A: 17-V-2003 (3).

Sesamia nonagrioides Lefèbvre, 1827

A: 20-IV-2002, 24-IV-2004, 25-VIII-2004.

+ *Episema grueneri* Boisduval, 1837

A: VIII-1997, 15-X-1999 (2), 25-X-2003, 7-X-2006 (18).

Leucochlaena oditis (Hübner, 1822)
A: 25-X-2002, 7-X-2006.

Agrochola lychnidis ([Denis & Schiffermüller], 1775)
A: 27-XII-2000 (2), 23-XI-2002 (7), 8-XII-2002 (6), 27-XII-2002, 29-30-XI-2003 (12), 26-XII-2003, 28-XII-2004 (5), 26-XII-2005 (3), 26-27-XI-2006 (25), 10-XI-2010 (2), 26-XII-2011 (3).

Agrochola lunosa (Haworth, 1809)
A: 8-IX-1998, 25-VIII-1998, 2-XI-2001 (3), 25-X-2002 (5), 25-X-2003 (4).

+ *Agrochola blidaensis* (Stertz, 1915)
A: 27-XII-2006.

+ *Conistra ligula* (Esper, 1791)
A: 27-XII-2000; 26-XII-2005 (3).

+ *Conistra haleae* Fibiger & Top-Jensen, 2010
A: 26-XII-2005. Dissected.

+ *Conistra staudingeri* (Graslin, 1863)
A: 15-II-2002.

+ *Lithophane semibrunnea* (Haworth, 1809)
A: 20-I-2002.

+ *Dryobota labecula* (Esper, 1788)
A: 20-I-2002, 26-XII-2005 (4), 26-XII-2011 (4); **L:** 26-IV-2003 on *Quercus rotundifolia*, 8-IV-2001 on *Quercus rotundifolia.*

Dryobotodes monochroma (Esper, 1790)
A: 10-XI-2010 (3).

Dryobotodes roboris (Geyer, 1835)
A: 1-XI-2001, 10-XI-2010 (8).

+ *Trigonophora flammea* (Esper, 1785)
A: 29-30-XI-2003 (2).

+ *Aporophyla chioleuca* (Herrich-Schäffer, 1850)
A: 1-XI-2001 (2); 10-XI-2010 (6).

+ *Aporophyla lueneburgensis* (Freyer, 1848)
A: 23-XI-2002.

Aporophyla nigra (Haworth, 1809)

A: IX-1998 (2), 1-XI-2001 (2), 25-X-2002 (17), 23-XI-2002 (3), 8-XII-2002, , 25-X-2003, 29-30-XI-2003 (16), 26-XII-2003 (3), 28-XII-2004, 26-XII-2005 (4), 26-XI-2006 (9), 10-XI-2010 (2); **L:** 8-IV-2001 on *Urginea maritima* and *Lathyrus clymenum* L.*,* 3-III-2003 on *Asparagus aphyllus* L.*,* 4-III-2007 on *Urginea maritima.*

Polymixis flavicincta ([Denis & Schiffermüller], 1775)

A: XII-1998, 1-XI-2001, 29-30-XI-2003 (8), 28-XII-2004 (2), 26-XII-2005 (3), 26-XI-2006, 26-XII-2011.

Mniotype occidentalis Yela, Fibiger, Ronkay & Zilli, 2010

A: 15-X-1999, 15-IV-2001, 1-XI-2001 (5), 14-II-2002, 21-IX-2002, 25-X-2002 (19), 25-X-2003 (4), 29-30-XI-2003 (6), 28-XII-2004, 26-XII-2005 (2), 7-X-2006, 26-XI-2006, 10-XI-2010 (2).

+ *Orthosia incerta* (Hufnagel, 1766)

A: 15-II-2002, 3-III-2003.

+ *Orthosia cerasi* (Fabricius, 1775)

A: 21-II-2004, 12-III-2005 (2).

Orthosia cruda ([Denis & Schiffermüller], 1775)

A: 14-II-2004.

Anarta trifolii (Hufnagel, 1766)

A: 22-V-1999, 20-IV-2002, 8-VI-2002, 22-VI-2002 (2), 25-X-2002, 16-V-2003, 23-24-VI-2003 (4), 13-VIII-2004 (2), 25-VIII-2004, 12-III-2005.

Lacanobia oleracea (Linnaeus, 1758)

A: 22-IV-2000, 9-VI-2002, 28-III-2003, 26-IV-2003, 25-IV-2004.

Hecatera weissi (Draudt, 1934)

A: 22-IV-2000, 13-VIII-2000, 25-26-V-2002 (9), 8-9-VI-2002 (55), 22-VI-2002 (3), 25-26-IV-2003 (6), 16-17-V-2003 (5), 24-25-IV-2004 (13).

Hecatera dysodea ([Denis & Schiffermüller], 1775)

A: 8-IV-2001, 15-IX-2001, 25-IV-2003, 17-V-2003, 23-VI-2003 (2), 14-VIII-2004 (3), 26-VIII-2004.

Hadena confusa (Hufnagel, 1766)

A: 20-IV-2002 (2), 28-III-2003 (2), 26-IV-2003.

Hadena perplexa ([Denis & Schiffermüller], 1775)

A: 20-IV-2002 (2), 25-IV-2003 (2).

Hadena sancta (Staudinger, 1859)

A: 4-III-2000, 7-IV-2000.

Mythimna unipuncta (Haworth, 1809)

A: 24-VIII-2000, 28-II-2003 (2), 26-IV-2003 (3), 16-17-V-2003 (5), 23-24-VI-2003 (3), 13-VIII-2004, 24-VIII-2004, 26-XI-2006 (6), 27-XII-2006, 1-IX-2007.

Mythimna sicula (Treitschke, 1835)

A: 22-IV-2000, 8-IV-2001, 15-IX-2001, 20-IV-2002 (35), 26-V-2002, 8-VI-2002, 20-21-IX-2002 (8), 25-X-2002 (2), 28-II-2003, 28-29-III-2003, 25-26-IV-2003 (77), 16-17-V-2003 (5), 24-VI-2003 (2), 14-II-2004, 24-25-IV-2004 (47), 25-26-VIII-2004, 12-III-2005 (5), 7-X-2006 (3), 26-XI-2006, 1-IX-2007.

Mythimna albipuncta ([Denis & Schiffermüller], 1775)

A: 8-IV-2001, 12-VI-2001, 20-IV-2002 (5), 8-9-VI-2002 (32), 22-VI-2002 (2), 28-III-2003, 26-IV-2003 (2), 23-VI-2003, 13-III-2004, 24-25-IV-2004.

Mythimna l-album (Linnaeus, 1767)

A: 8-9-VI-2002, 23-VI-2003, 25-IV-2004.

Mythimna vitellina (Hübner, 1808)

A: 26-VIII-1997, 1-IV-1999, 12-VI-2001, 15-IX-2001, 20-IV-2002 (10), 23-XI-2002, 25-26-IV-2003 (13), 16-17-V-2003 (3), 24-25-IV-2004 (6), 13-14-VIII-2004, 12-III-2005, 7-X-2006 (3), 1-IX-2007.

Leucania putrescens (Hübner, 1824)

A: VIII-1997, 15-IX-2001 (4), 20-21-IX-2002, 17-V-2003, 14-VIII-2004 (3), 26-VIII-2004, 7-X-2006 (25), 1-IX-2007.

Leucania punctosa (Treitschke, 1825)

A: 20-IX-2002, 7-X-2006 (13).

Leucania loreyi (Duponchel, 1827)

A: VIII-1997, 1-XI-2001 (2), 20-IV-2002, 8-9-VI-2002 (6), 25-X-2002 (3), 23-XI-2002 (11), 27-XII-2002, 23-24-VI-2003, 13-14-VIII-2004 (3), 25-VIII-2004, 7-X-2006 (3), 26-XI-2006, 27-XII-2006, 4-III-2007 (2); **L:** 27-XII-2000, 8-IV-2001, 27-XII-2001 on *Poa annua* and other Gramineae.

Peridroma saucia (Hübner, 1808)

A: 22-IV-1999, 20-I-2002, 8-VI-2002, 23-XI-2002 (7), 25-I-2003, 3-III-2003 (2), 26-IV-2003, 17-V-2003, 26-XII-2003, 7-X-2006, 26-XI-2006 (2), 27-XII-2006, 4-III-2007.

Agrotis bigramma (Esper, 1790)

A: 15-IX-2001 (4), 20-IX-2002 (2), 25-26-VIII-2004 (2).

Agrotis lata Treitschke, 1835

A: 15-IX-2001 (3), 20-21-IX-2002 (7), 25-26-VIII-2004, 7-X-2006 (4), 1-IX-2007.

Agrotis segetum ([Denis & Schiffermüller], 1775)

A: 20-I-2002 (2), 14-15-II-2002 (8), 20-IV-2002, 26-V-2002 (3), 8-9-VI-2002 (4), 20-IX-2002, 25-X-2002 (2), 23-XI-2002 (2), 27-XII-2002 (9), 25-I-2003 (2), 28-II-2003, 3-III-2003 (2), 28-29-III-2003 (3), 25-IV-2003, 16-17-V-2003 (2), 23-24-VI-2003 (3), 30-XI-2003, 21-II-2004, 13-III-2004 (3), 24-IV-2004, 25-IV-2004, 14-VIII-2004 (2), 25-26-VIII-2004 (2), 26-XI-2006 (2), 27-XII-2006.

Agrotis trux (Hübner, 1824)

A: 14-II-2002, 27-XII-2002 (2), 7-X-2006.

Agrotis puta (Hübner, 1803)

A: 1-IV-1999 (2), 14-15-II-2002 (6), 20-IV-2002 (4), 28-II-2003 (2), 3-III-2003 (4), 28-III-2003

(12), 29-III-2003 (2), 25-IV-2003 (1), 26-IV-2003 (4), 14-II-2004 (2), 21-II-2004 (3), 13-III-2004 (29), 24-IV-2004 (7), 25-IV-2004 (7), 12-III-2005 (12), 7-X-2006 (12), 4-III-2007 (6).

Agrotis catalaunensis (Millière, 1873)
A: 3-III-2003.

Agrotis ipsilon (Hufnagel, 1766
A: 20-I-2002 (6), 14-II-2002 (3), 20-IV-2002, 25-V-2002, 23-XI-2002 (3), 3-III-2003, 14-VIII-2004, 25-VIII-2004.

Agrotis spinifera (Hübner, 1808)
A: 1-IV-1999, 4-III-2000, 8-IV-2001, 16-V-2003, 26-XI-2006 (3), 10-XI-2010.

Ochropleura plecta (Linnaeus, 1761)
A: 8-VI-2002, 9-VI-2002, 26-IV-2003 (2).

Ochropleura leucogaster (Freyer, 1831)
A: 18-VI-2000, 1-XI-2001, 20-IV-2002, 25-26-V-2002 (3), 9-VI-2002 (7), 23-XI-2002, 28-II-2003 (2), 26-IV-2003 (3), 16-17-V-2003 (10), 23-VI-2003 (2), 25-X-2003, 30-XI-2003, 25-VIII-2004, 12-III-2005, 26-XI-2006, 4-III-2007 (2), 1-IX-2007.

Cerastis faceta (Treitschke, 1835)
A: 20-I-2002 (8), 14-15-II-2002 (24), 8-XII-2002 (2), 27-XII-2002 (7), 25-I-2003 (29), 28-II-2003 (2), 3-III-2003 (4), 29-XI-2003 (4), 30-XI-2003 (5), 26-XII-2003 (2), 14-II-2004 (2), 28-XII-2004 (9), 12-III-2005 (13), 26-XII-2005 (5), 26-XI-2006 (2), 4-III-2007, 26-XII-2011 (6).

Noctua pronuba (Linnaeus, 1758)
A: 25-X-2002 (3), 25-26-IV-2003 (8), 16-17-V-2003 (3), 24-IV-2004, 26-XI-2006. **L:** 27-XII-2000, 19-I-2002, 15-II-2002, 27-XII-2006 on *Urginea maritima* and *Poa annua.*

+ *Xestia kermesina* (Mabille, 1869)
A: 7-X-2006.

Xestia xanthographa ([Denis & Schiffermüller], 1775)
A: 14-VIII-2004, 7-X-2006.

Xestia c-nigrum (Linnaeus, 1758)
A: 25-X-2002.

LASIOCAMPOIDEA
LASIOCAMPIDAE (Following ZOLOTUHIN *et al.,* 2012)
POECILOCAMPINAE

Trichiura ilicis (Rambur, 1866)
A: 3-III-2003, 12-III-2005; **L:** 26-IV-2003 on *Quercus rotundifólia.*

MALACOSOMINAE

Malacosoma neustria (Linnaeus, 1758)
A: 22-V-1999 (2), 8-VI-2002, 9-VI-2002, 16-V-2003 (5), 17-V-2003 (12); **L:** 22-IV-2000 on

Quercus rotundifolia and *Q. coccifera*, 8-IV-2001 on *Q. rotundifolia*, *Populus nigra* L. and *Pyrus bourgaeana.*

LASIOCAMPINAE

Lasiocampa trifolii ([Denis & Schiffermüller], 1775)

A: 15-X-1999, 15-IX-2001 (4), 20-IX-2002 (11), 21-IX-2002 (7), 7-X-2006 (5). **L:** IV-2000, 8-IV-2001, 27-XII-2001, 20-I-2002 on *Retama sphaerocarpa, Quercus rotundifolia* and *Trifolium spp.,* 15-II-2002, 20-IV-2002, 27-XII-2002, 25-I-2003, 28-II-2003, 3-III-2003, 29-III-2003, 17-V-2003 on *Retama sphaerocarpa,* 26-XII-2003, 14-II-2004, 21-II-2004, 14-III-2004.

Phyllodesma suberifolia (Duponchel, 1842)

A: 26-VIII-1997 (2), 25-IV-2003, 25-26-VIII-2004 (4), 7-X-2006.

BOMBYCOIDEA
BRAHMAEIDAE

(*) *Lemonia philopalus* (Donzel, 1842)

A: 23-XI-2002 record published in (Marabuto 2003), 30-XI-2003, 27-XII-2006 (6). **L:** IV-1998, V-1998, IV-1999, 22-IV-2000, 8-IV-2001 on *Crepis vesicaria* L. and *Sonchus oleraceus*.

SATURNIIDAE
SATURNIINAE

Saturnia pyri ([Denis & Schiffermüller], 1775)

A: VI-1998, 20-IV-2002, 29-III-2003, 24-IV-2004.

SPHINGIDAE
SPHINGINAE

+ *Laothoe populi* (Linnaeus, 1758)

A: 26-VIII-1997, 7-IV-2000, 28-III-2003, 17-V-2003 (2), 14-VIII-2004.

Agrius convolvuli (Linnaeus, 1758)

A: 15-VIII-1998, 13-VIII-2000, 21-IX-2002 (3), 14-VIII-2004.

(*) *Agrius cingulata* (Fabricius, 1775) (Fig. 3J)

21-IX-2002, record published in (MARABUTO, 2006). A single specimen of this Neotropical species was collected, together with other dispersive species on the same night. Until 2017, this is possibly still the only genuinely migrant specimen to Europe, but whose origin remains unknown. The nearest known breeding populations are located in the Cape Verde Islands, Senegal and Côte d'Ivoire (BAUER & TRAUB, 1980; BALLESTEROS-MEJIA *et al.,* 2011).

+ *Acherontia atropos* (Linnaeus, 1758)

A: 12-IX-1997, 17-V-2003.

MACROGLOSSINAE

Macroglossum stellatarum (Linnaeus, 1758)

A: 13-III-2004, 12-III-2005.

+ *Proserpinus proserpina* (Pallas, 1772)
A: 20-IV-2002.

Hyles livornica (Esper, 1780)
A: 18-VI-2000, 12-VI-2001, 25-26-V-2002 (12), 8-9-VI-2002 (9), 22-VI-2002 (2), 25-IV-2003, 17-V-2003, 23-24-VI-2003 (8), 24-25-IV-2004 (4); **L:** 13-VI-2003 on *Asphodelus ramosus.*

Hippotion celerio (Linnaeus, 1758)
A: 22-VI-2002, 25-X-2002 (2).

Conclusions

Among the 357 species, recorded in this study, some represent interesting known-range extensions from the south (Algarve) and are part of a xerothermophilous, thermomediterranean faunal assemblage widespread along the southern Iberian coasts. Others are widely known throughout the country and their novelty for Baixo Alentejo is clearly a product of undersampling. Having the study been focused on the larger species in the first place (Papilionoidea, larger Ditrysia) moving on the smaller species – 'Micros' much later, data may be considered biased for the former groups and further considerations on the ratios and abundance of certain groups must be witheld until better data is available.

From near the end of the field-work, most natural or semi-natural habitats have faced generalised degradation. This has occurred through area-loss, change from a dry-crop based system to an irrigated dependence, and higher input of herbicide / pesticide regimen occurring within crops but also roadsides and common areas. There was a visible loss of biodiversity, which can be ultimately attributed to the EDIA / Alqueva irrigation infrastructure and economic pressure put into the change of an agricultural paradigm but also to the survey-site changing ownership. This stimulated the cessation of the field-work for the micro-environmental conditions were changing, falling appart from the goal of establishing a baseline situation which I believe may have been set in a sensible way.

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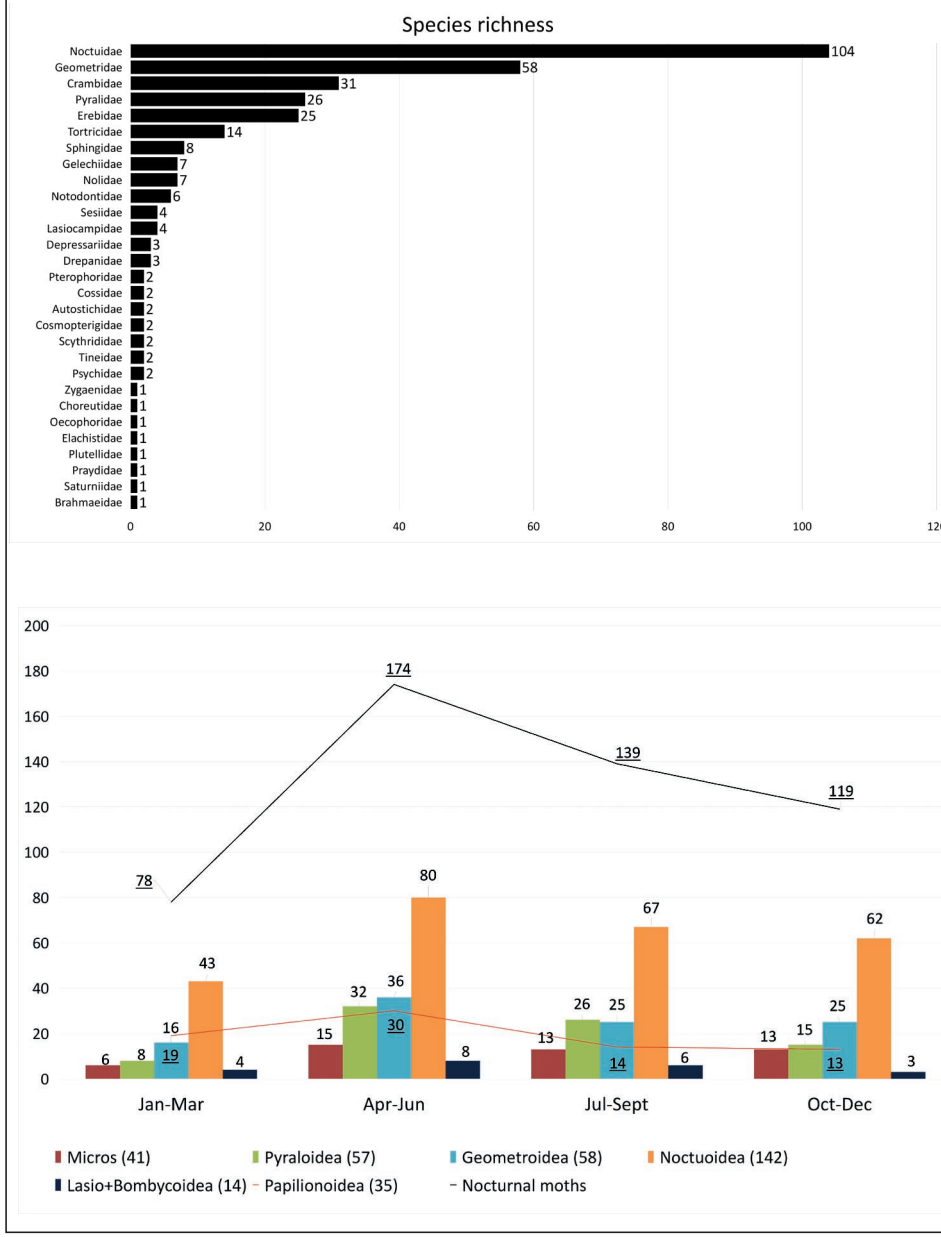

Figure 2.– A) Moth species richness, by family, at Monte da Lage (Serpa, Beja); **B)** Seasonal species richness in main moth groups.

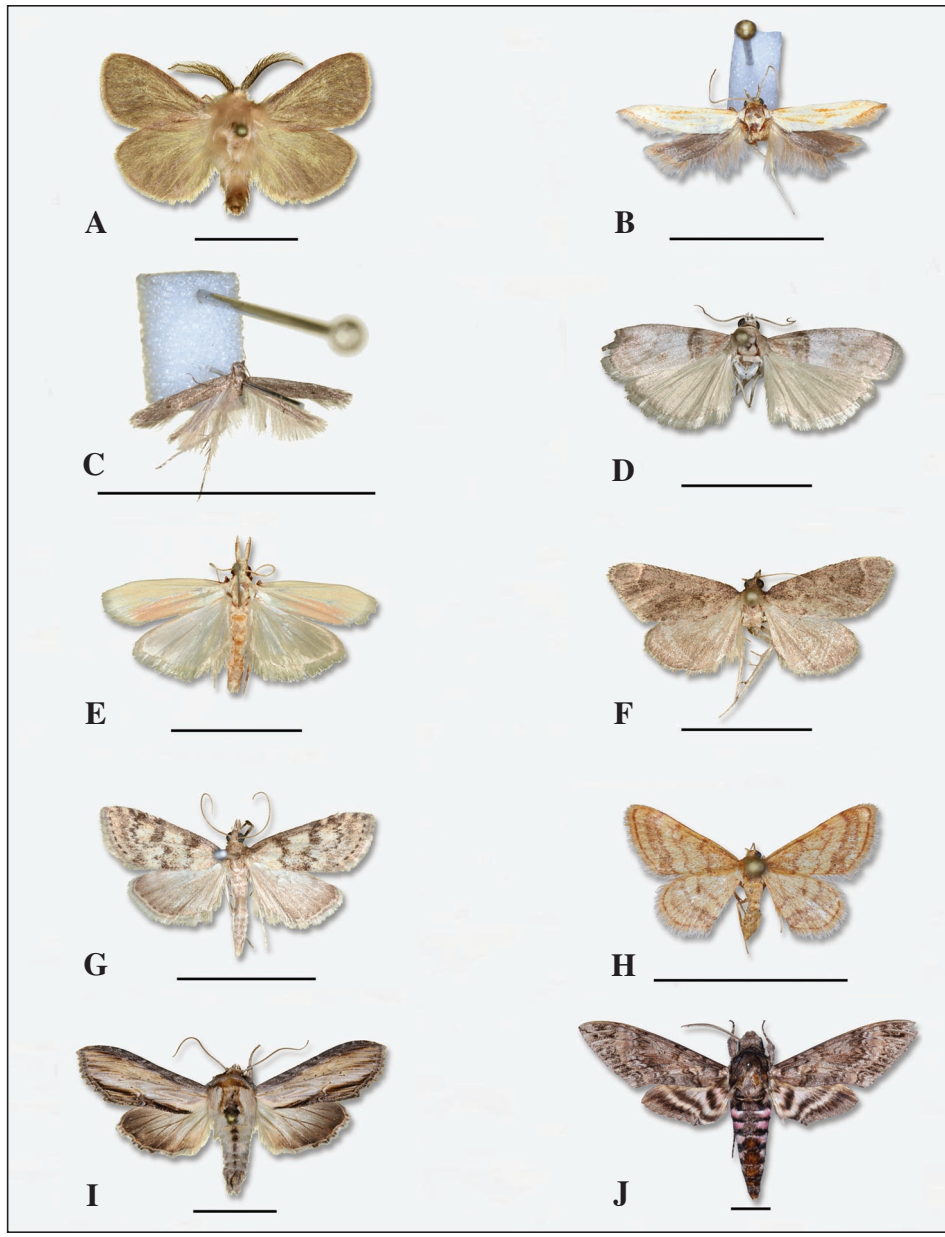

Figure 3.– A) *Oiketicoides eganai* (Agenjo, 1962); **B)** *Metzneria agraphella* (Ragonot, 1895); **C)** *Monochroa hornigi* (Staudinger, 1883); **D)** *Sciota elegiella* (Zerny, 1928); **E)** *Hypsotropa vazquezi* Gastón, Macià, Ylla & Huertas-Dionisio, 2016; **F)** *Stemmatophora syriacalis* (Ragonot, 1895); **G)** *Udea bipunctalis* (Herrich-Schäffer, 1851); **H)** *Idaea manicaria* (Herrich-Schäffer, 1851); **I)** *Cucullia lychnitis* Rambur, 1833; **J)** *Agrius cingulata* (Fabricius, 1775). Scale-bar of 10 mm under each specimen.